



Competency Based Learning Materials (CBLM)

IT Support Service

Level-3

Module: Maintaining and Troubleshooting Personal Computer

Code: CBLM-OU-ICT-ITSS-07-L3-EN-V1



**National Skills Development Authority
Prime Minister's Office
Government of the People's Republic of Bangladesh**

Copyright

National Skills Development Authority
Prime Minister's Office
Level: 10-11, Biniyog Bhaban,
E-6 / B, Agargaon, Sher-E-Bangla Nagar Dhaka-1207, Bangladesh.
Email: ec@nsda.gov.bd
Website: www.nsga.gov.bd.
National Skills Portal: <http://skillsportal.gov.bd>

This Competency Based Learning Materials (CBLM) on “Maintaining and Troubleshooting Personal Computer” under the IT Support Service, Level-3 qualification is developed based on the national competency standard approved by National Skills Development Authority (NSDA)

This document is to be used as a key reference point by the competency-based learning materials developers, teachers/trainers/assessors as a base on which to build instructional activities.

National Skills Development Authority (NSDA) is the owner of this document. Other interested parties must obtain written permission from NSDA for reproduction of information in any manner, in whole or in part, of this Competency Standard, in English or other language.

This Competency Based Learning Materials is a document for the development of curricula, teaching and learning materials, and assessment tools. It also serves as the document for providing training consistent with the requirements of industry in order to meet the qualification of individuals who graduated through the established standard via competency-based assessment for a relevant job.

This document has been developed by NSDA in association with industry representatives, academia, related specialist, trainer and related employee.

Public and private institutions may use the information contained in this CBLM for activities benefitting Bangladesh.

List of Abbreviations

CS	- Competency Standard
ISC	- Industry Skills Council
NSDA	- National Skills Development Authority
NSQF	- National Skills Qualifications Framework
BNQF	- Bangladesh National Qualifications Framework
OSH	- Occupational Safety and Health
PPE	- Personal Protective Equipment
SCVC	- Standards and Curriculum Validation Committee
STP	- Skills Training Provider
SOP	- Standard Operating Procedure
UoC	- Unit of Competency
EC	- Executive Committee
CBT&A	- Competency based Training & Assessment
CBC	- Competency based Curriculum
CAD	- Course Accreditation Document
CBLM	- Competency Based Learning Materials

How to use this Competency Based Learning Materials (CBLMs)

The module, Maintaining and Troubleshooting Personal Computer contains training materials and activities for you to complete. These activities may be completed as part of structured classroom activities or you may be required you to work at your own pace. These activities will ask you to complete associated learning and practice activities in order to gain knowledge and skills you need to achieve the learning outcomes.

1. Review the **Learning Activity** page to understand the sequence of learning activities you will undergo. This page will serve as your road map towards the achievement of competence.
2. Read the **Information Sheets**. This will give you an understanding of the jobs or tasks you are going to learn how to do. Once you have finished reading the **Information Sheets** complete the questions in the **Self-Check**.
3. **Self-Checks** are found after each **Information Sheet**. **Self-Checks** are designed to help you know how you are progressing. If you are unable to answer the questions in the **Self-Check** you will need to re-read the relevant **Information Sheet**. Once you have completed all the questions check your answers by reading the relevant **Answer Keys** found at the end of this module.
4. Next move on to the **Job Sheets**. **Job Sheets** provide detailed information about *how to do the job* you are being trained in. Some **Job Sheets** will also have a series of **Activity Sheets**. These sheets have been designed to introduce you to the job step by step. This is where you will apply the new knowledge you gained by reading the Information Sheets. This is your opportunity to practice the job. You may need to practice the job or activity several times before you become competent.
5. Specification **sheets**, specifying the details of the job to be performed will be provided where appropriate.
6. A review of competency is provided on the last page to help remind if all the required assessment criteria have been met. This record is for your own information and guidance and is not an official record of competency

When working through this Module always be aware of your safety and the safety of others in the training room. Should you require assistance or clarification please consult your trainer or facilitator.

When you have satisfactorily completed all the Jobs and/or Activities outlined in this module, an assessment event will be scheduled to assess if you have achieved competency in the specified learning outcomes. You will then be ready to move onto the next Unit of Competency or Module

Approved by

---th Executive Committee (EC) Meeting of NSDA

Held on -----

Deputy Director (Admin)
and
Officer of Secretarial Duties for EC meeting
National Skills Development Authority

TABLE OF CONTENTS

Copyright	i
List of Abbreviations	ii
How to use this Competency Based Learning Materials (CBLMs)	iii
Module Content.....	1
Learning Outcome 1: Prepare for Troubleshoot	2
Learning Experience 1: Prepare for Troubleshoot	3
Information Sheet 1: Preparing for Troubleshoot	4
Self-Check Sheet 1: Preparing for Troubleshoot	7
Answer Key 1: Preparing for Troubleshoot	8
Learning Outcome 2: Identify the problem.....	9
Learning Experience 2: Identify the problem.....	10
Information Sheet 2: Identifying the problem.....	11
Self-Check Sheet 2: Identify the problem	16
Answer Key 2: Identify the problem	17
Task Sheet 2.1: Identifying the problem	18
Learning Outcome 3: Identify the possible cause of fault	19
Learning Experience 3: Use presentation application	20
Information Sheet 3: Identify the possible cause of fault	21
Self-Check Sheet 3: Identify the possible cause of fault.....	26
Answer Key 3: Identify the possible cause of fault.....	27
Task Sheet 3.1: Identify the possible cause of fault.....	28
Learning Outcome 4: Fix the problem.....	29
Learning Experience 4: Fix the problem.....	30
Information Sheet 4: Fixing the problem	31
Self-Check Sheet 4: Fixing the problem	36
Answer Key 4: Fixing the problem	37
Task Sheet 4.1: Fixing the problem	38
Learning Outcome 5: Update document.....	39
Learning Experience 5: Update document.....	40
Information Sheet 5: Updating document.....	41
Self-Check Sheet 5: Updating document	44
Answer Key 5: Updating document	45
Review of Competency	46
Reference:	48

MODULE CONTENT

Unit of Competency	Maintain and Troubleshoot Personal Computer
Unit Code	OU-ICT-ITSS-07-L3-V1
Module Title	Maintaining and Troubleshoot Personal Computer
Module Descriptor	This module discusses the aspects that must be given attention when Maintaining and Troubleshooting Personal Computer. It shows the knowledge and skills requirements for preparing for troubleshooting, identifying the problem, identifying the possible cause of fault, fixing the problem and updating document.
Nominal Hours	30 Hours
Lerning Outcome	After completion of this module the trainees must be able to: <ol style="list-style-type: none">1. Prepare for Troubleshoot2. Identify the problem3. Identify the possible cause of fault4. Fix the problem5. Update document

Assessment Criteria:

1. Required tools and equipment's are selected and collected for troubleshooting
2. Appropriate person is interviewed about the problem
3. Computer manuals and maintenance documents are reviewed
4. Problems are detected through physical observation
5. Problems are detected using diagnostic tools
6. Identified problems are documented
7. Appropriate person (if required) is consulted
8. Cause of fault is identified
9. Testing is performed to ensure the cause of fault
10. Repair or Replacement cost is calculated and approved from the appropriate person.
11. Faulty hardware equipment or software component is repaired or replaced
12. Repaired/replaced equipment is tested
13. Performance of PC is tested
14. Computer maintenance and troubleshooting status are documented
15. Documented status is reported to the authority.

Learning Outcome 1: Prepare for Troubleshoot

Assessment Criteria:

- 1.1 Required tools and equipment's are selected and collected for troubleshooting
- 1.2 Appropriate person is interviewed about the problem.

Content:

1. Tools and equipment's for troubleshooting
2. Interviewing Appropriate person

Resources Required/ Conditions:

The trainees must be provided with the following:

- Handouts or reference materials/books/ CBLMs on the above stated contents
- PCs/printers or laptop/printer with internet access
- Digital projector and Screen
- Bond paper
- Ball pens/pencils and other office supplies and materials
- Relevant learning materials
- Workplace or simulated environment

Methodologies

- Lecture/discussion
- Demonstration/application
- Presentation
- Blended delivery methods

Assessment Methods

- Written test
- Demonstration
- Observation with checklist
- Oral questioning
- Portfolio

Learning Experience 1: Prepare for Troubleshoot

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Trainee will ask the instructor about Preparing for Troubleshoot	1. Instructor will provide the learning materials “Maintaining and Troubleshooting Personal Computer”
2. Read the Information sheet/s	2. Information Sheet No: 1 Preparing for Troubleshoot
3. Complete the Self Checks & Check answer sheets.	3. Self-Check/s Self-Check No: 1 Preparing for Troubleshoot Answer key No. 1 Preparing for Troubleshoot
4. Read the Job Sheet and Specification Sheet and perform job	4. Job- Sheet No: 1- Preparing for Troubleshoot Specification Sheet 1 – Preparing for Troubleshoot

Information Sheet 1: Preparing for Troubleshoot

Learning Objectives:




After completion of this information sheet, the learners will be able to:

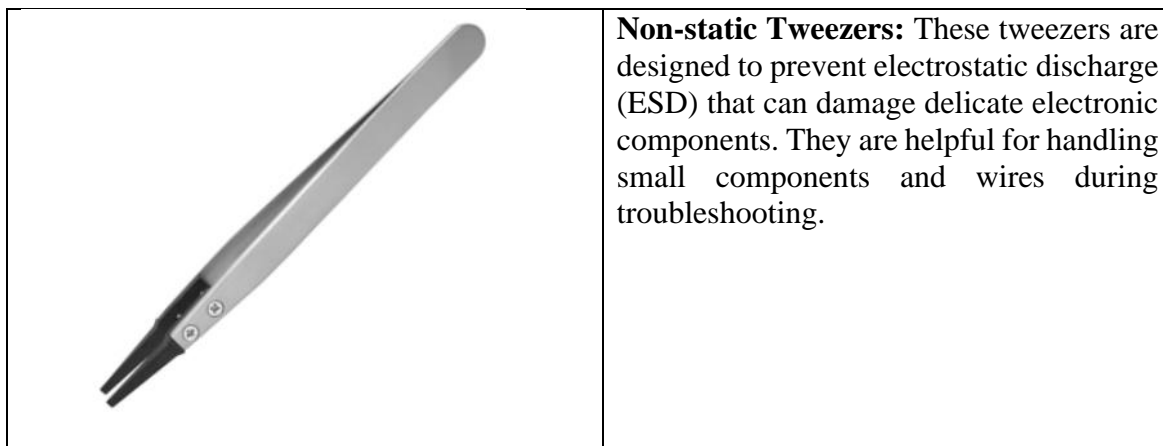
- 1.1 Select and collect Required tools and equipment's for troubleshooting
- 1.2 Interview Appropriate person about the problem

1.1 Required tools and equipment's for troubleshooting

The specific tools and equipment you'll need for troubleshooting depend on the type of troubleshooting you're performing. Here's a breakdown of essential tools for various scenarios:

General Troubleshooting Tools:

	<p>Multimeter: This versatile tool measures voltage, current, and resistance, allowing you to check electrical signals in electronic devices. It's crucial for troubleshooting electrical issues in circuits, power supplies, and various electronic components.</p>
	<p>Flashlight: A simple flashlight helps illuminate dark areas within devices or computer components, making it easier to inspect potential problems.</p>
	<p>Screwdrivers: A set of screwdrivers (flathead and Phillips head) in different sizes is necessary for opening electronic devices and accessing components.</p>



Spare Parts: Having a small stock of common replacement parts like fuses, batteries, or cables can be helpful for quick troubleshooting and resolving basic issues.

Documentation: Having user manuals, schematics, or online troubleshooting guides for the specific device you're working on can be invaluable. This documentation provides information on component functions, expected values, and potential troubleshooting steps.

Computer Troubleshooting Tools:

Diagnostics Software: Specialized software can diagnose hardware and software issues on computers. These tools can perform tests on memory, hard drives, and other components, helping to pinpoint potential problems.

Bootable USB Drive: A bootable USB drive containing a diagnostic operating system or recovery tools can be used to troubleshoot issues that prevent the computer from booting normally.

Disk Management Tools: Disk management tools built into operating systems or available as separate software can help manage hard drives, partitions, and troubleshoot storage-related issues.

Network Troubleshooting Tools:

Cable Tester: A cable tester can verify the functionality of network cables, identifying issues like breaks, shorts, or incorrect wiring that can disrupt network connectivity.



Network Scanner: Network scanners can scan your network for connected devices, identify potential conflicts, and help troubleshoot connectivity problems.

Ping and Traceroute Tools: These built-in command-line tools (ping) or network diagnostic software (traceroute) help test network connectivity and identify potential bottlenecks or network congestion points.

1.2 Interviewing Appropriate person

In a troubleshooting situation, interviewing the appropriate person is crucial for gathering essential information and efficiently resolving the problem. Here's a guide to identifying and interviewing the right person to aid in troubleshooting:

Initial Assessment:

Gather Basic Details: Start by understanding the nature of the problem and the affected system (computer, network device, software).

Identify Potential Users: Consider who typically uses the system or encounters the issue. This could be an individual user, a specific department, or a wider group.

Prioritize Interviewees:

Direct User: If possible, prioritize interviewing the person who directly encountered the problem. They can provide firsthand details on the symptoms, what they were doing when the issue occurred, and any error messages.

System Administrator/IT Support: If the issue affects a broader system or network, interview the system administrator or IT support personnel responsible for maintaining that system. They have a deeper understanding of the system's configuration and might have encountered similar issues before.

Subject Matter Expert (SME): For complex technical issues, consider interviewing a subject matter expert (SME) with specialized knowledge of the affected system or software. They can provide deeper insights and potential solutions.

Interview Techniques:

Active Listening: Actively listen to the interviewee's description of the problem. Ask clarifying questions to understand the details and avoid making assumptions.

Open-Ended Questions: Use open-ended questions like "What were you doing when the problem occurred?" or "Can you describe the error message you saw?" to gather detailed information.

Focus on Chronology: Establish a timeline of events leading up to the problem. When did it start? Did any changes occur to the system (updates, installations) before the issue arose?

Technical Jargon: Adjust your language based on the interviewee's technical expertise. Avoid overly technical terms if they might not understand, but still gather accurate information.

Self-Check Sheet 1: Preparing for Troubleshoot

1. What should I do before grabbing screwdrivers when troubleshooting a tech issue?
2. Who's the best person to talk to first when troubleshooting a computer problem?
3. Besides the user, who else might be helpful to interview for complex issues?
4. What's more important than fancy tools when interviewing someone about a tech problem?
5. Is there anything else besides talking to people that can help with troubleshooting?

Answer Key 1: Preparing for Troubleshoot

1. What should I do before grabbing screwdrivers when troubleshooting a tech issue?
Answer: Identify the type of problem! Different tools are needed for computers, networks, or electronic devices.
2. Who's the best person to talk to first when troubleshooting a computer problem?
Answer: The person who directly experienced the issue! They can give firsthand details about the problem.
3. Besides the user, who else might be helpful to interview for complex issues?
Answer: A system administrator or a subject matter expert (SME) with in-depth knowledge of the affected system or software.
4. What's more important than fancy tools when interviewing someone about a tech problem?
Answer: Active listening! Ask clarifying questions and understand the details of the issue before jumping to solutions.
5. Is there anything else besides talking to people that can help with troubleshooting?
Answer: Absolutely! Reviewing documentation like user manuals or error logs can provide valuable context and potential solutions.

Learning Outcome 2: Identify the problem

Assessment Criteria:

- 2.1 Computer manuals and maintenance documents are reviewed
- 2.2 Problems are detected through physical observation
- 2.3 Problems are detected using diagnostic tools
- 2.4 Identified problems are documented

Content:

1. Computer manuals and maintenance documents
2. Problems detection through physical observation
3. Problems detection using diagnostic tools
4. Problem documentation

Resources Required/ Conditions:

The trainees must be provided with the following:

- Handouts or reference materials/books/ CBLMs on the above stated contents
- PCs/printers or laptop/printer with internet access
- Digital projector and Screen
- Bond paper
- Ball pens/pencils and other office supplies and materials
- Relevant learning materials
- Workplace or simulated environment

Methodologies

- Lecture/discussion
- Demonstration/application
- Presentation
- Blended delivery methods

Assessment Methods

- Written test
- Demonstration
- Observation with checklist
- Oral questioning
- Portfolio

Learning Experience 2: Identify the problem

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about Identifying the problem	1. Instructor will provide the learning materials “Maintaining and Troubleshooting Personal Computer”
2. Read the Information sheet/s	2. Information Sheet No: 2 Identify the problem
3. Complete the Self Checks & Check answer sheets.	3. Self-Check/s Self-Check No: 2 - Identify the problem Answer key No. 2 - Identify the problem
4. Read the Job Sheet and Specification Sheet and perform job	4. Job- Sheet No: 2 - Identify the problem Specification Sheet: 2- Identify the problem

Information Sheet 2: Identifying the problem

Learning Objectives:

After completion of this information sheet, the learners will be able to:

- 2.1 Review Computer manuals and maintenance documents
- 2.2 Detect Problems through physical observation
- 2.3 Detect Problems using diagnostic tools
- 2.4 Document Identified problems

2.1 Reviewing Computer Manuals and Maintenance Documents for Identifying Problems

Computer manuals and maintenance documents can be invaluable resources for troubleshooting technical issues. They provide detailed information on the system's functionality, components, and potential problems. Here's how to effectively review these documents to identify the source of a computer problem:

Identifying the Relevant Documents:

User Manuals: Start by looking for the user manual for your specific computer model or software program experiencing the problem. User manuals typically provide basic troubleshooting steps, common error messages and explanations, and system specifications.

Hardware Manuals: If the issue seems hardware-related, locate the manual or specifications for the specific hardware component (e.g., motherboard, graphics card, memory). These documents can provide detailed information on component functionality, expected behavior, and potential troubleshooting steps.

Maintenance Documents: For advanced users, some systems might have maintenance documents with detailed technical specifications, troubleshooting guides, and diagnostic procedures.

Analyzing the Problem:

- **Match Symptoms:** Carefully compare the symptoms you're experiencing with the information in the manuals. Look for sections on troubleshooting common problems, error message explanations, or known issues with your specific hardware or software.
- **Component Specifications:** Review component specifications, especially if you suspect a hardware issue. Check if your hardware meets the minimum requirements for the software you're using or the task you're trying to perform.
- **Diagnostic Procedures:** Some manuals might outline diagnostic procedures for specific issues. These can involve checking specific settings, running diagnostic tools, or visually inspecting hardware components.

Effective Review Techniques:

Keywords and Search Functions: Many manuals are provided as digital files. Use the search function within the document to find keywords related to your specific problem symptoms (e.g., error message, blue screen, overheating).

Index and Table of Contents: Utilize the index or table of contents to navigate the manual efficiently. Look for sections on troubleshooting, error codes, or specific components related to your problem.

Illustrations and Diagrams: Pay attention to illustrations and diagrams in the manuals. They can help you identify components, locate specific settings, or understand how different parts of the system interact.

4. Additional Resources:

Online Knowledge Bases: Many hardware and software manufacturers maintain online knowledge bases with troubleshooting guides, FAQs, and solutions for common problems. Search for specific error messages or problems you're facing on their website.

Community Forums: Online communities and forums dedicated to computers can be a valuable resource. Search for discussions about similar issues and potential solutions from other users and experienced individuals.

Benefits of Reviewing Manuals:

Accurate Information: Manuals provide reliable and accurate information straight from the manufacturer, ensuring you're working with the correct specifications and troubleshooting steps.

Identifying Common Issues: Manuals often detail common problems users encounter and provide solutions or workarounds. This can save you time and effort in troubleshooting.

Understanding Components: Reviewing manuals helps you gain a better understanding of your system's components and their functionalities. This knowledge can be valuable for future troubleshooting or system maintenance.

2.2 Problem Detection Through Physical Observation for Computer Issues

While computers rely heavily on software diagnostics, physical observation can be a surprisingly useful tool for identifying potential hardware problems. Here's how to use your senses to detect signs of trouble in your computer:

Visual Cues:

Burned Fuse

A typical personal computer or a laptop has a switching power supply unit. Such a power supply unit has a full-wave rectifier bridge (Graetz) plus a relatively large electrolytic capacitor at the mains input (230V AC, for example). At a cold start, you are connecting an uncharged capacitor to the mains - it results in a significant peak of an inrush current that charges that capacitor.



Lights: Observe the power supply unit (PSU) and motherboard status lights. Abnormal blinking or lights staying off can indicate problems with power delivery or component failure.

Fans: Look for dust buildup on fans or vents, which can obstruct airflow and lead to overheating. Check if fans are spinning freely and not making any unusual noises.

Components: Visually inspect the inside of your computer for any burnt components, bulging capacitors (on motherboards), or loose cables. These can be signs of overheating, electrical damage, or faulty connections.



Monitors: Look for physical damage on the monitor like cracks, dead pixels, or flickering images, which could indicate display issues.

Heat: Carefully feel the exterior of the computer case, especially around vents. Excessive heat can be a symptom of overheating components like the CPU or GPU.

Fans: While the computer is off, gently spin the fans to check for any resistance or grinding noises, suggesting a failing fan bearing.

Hearing:

Fan Noise: Listen for any abnormal noises from the fans, such as grinding, clicking, or excessive whirring. This could indicate failing fan bearings or obstructions in the airflow path.

Beeps: Some motherboards emit a series of beeps during startup to indicate specific hardware errors. Consult your motherboard manual to decipher the beep codes.

Smell:

Burning Plastic: A strong burning plastic smell is a serious sign of potential electrical damage or overheating components. Shut down the computer immediately and seek professional help.

2.3 Problem Detection Using Diagnostic Tools for Computer Troubleshooting

Diagnostic tools are specialized software applications or hardware devices designed to identify and pinpoint problems within your computer system. They play a crucial role in troubleshooting various computer issues, often complementing the information gathered through physical observation and user experience. Here's how diagnostic tools can be used for problem detection:

Types of Diagnostic Tools:

Hardware Diagnostics:

Boot Diagnostics: These tools are often pre-installed on your computer's motherboard or can be run from bootable media (USB drive). They perform a series of tests on essential hardware components like memory (RAM), hard drive, and basic functionality checks.

Component-Specific Tools: Manufacturers of graphics cards, motherboards, or other components might offer dedicated diagnostic tools to test the functionality of those specific parts.

Software Diagnostics:

System Monitoring Tools: These monitor system resources like CPU usage, memory utilization, and disk activity in real-time. They can help identify performance bottlenecks or resource overuse that might be causing issues.

Event Viewer: The built-in Windows Event Viewer logs system events, including errors, warnings, and informational messages. Analyzing these logs can reveal software crashes, driver issues, or hardware problems reported by the system.

Stress Testing Tools: These tools intentionally put a heavy load on your CPU, memory, or storage to test for stability and identify potential overheating issues.

Using Diagnostic Tools Effectively:

Identifying the Problem: Choose the appropriate diagnostic tool based on the nature of the problem you're experiencing.

System crashes or performance issues might warrant system monitoring tools or stress testing software.

Suspected hardware problems might require boot diagnostics or manufacturer-specific tools.

Interpreting Results: Diagnostic tools often generate reports or error messages. Research the error codes or consult the tool's documentation to understand their meaning and potential causes.

Limitation of Automation: Diagnostic tools are powerful, but they can't always pinpoint the exact cause of a problem. Analyze the results alongside other troubleshooting methods like user experience and physical observation for a holistic diagnosis.

Benefits of Diagnostic Tools:

Accuracy and Efficiency: Diagnostic tools can automate testing procedures, saving time and effort compared to manual troubleshooting.

In-Depth Analysis: They can provide detailed information about system behavior and pinpoint specific hardware or software components causing issues.

Predictive Maintenance: Some diagnostic tools can identify potential problems before they cause major failures, allowing for preventive maintenance.

Examples of Popular Diagnostic Tools:

Windows Memory Diagnostic: Built-in tool for testing your computer's memory (RAM) for errors.

Crystal DiskInfo: Monitors hard drive health and performance.

MemTest86: A popular standalone tool for in-depth memory testing.

Prime95: A stress testing tool that puts a heavy load on your CPU.

Speccy: Provides detailed system information about hardware components.

2.4 Problem Documentation After Identifying a Computer Problem

Once you've identified a computer problem through various methods like observation, user experience, or diagnostic tools, documenting the issue effectively becomes crucial. This documented information serves several purposes:

Clear Communication: A well-documented problem description facilitates clear communication between you (the troubleshooter) and anyone involved in resolving the issue, such as technical support personnel or a technician.

Improved Troubleshooting: Detailed documentation helps you track the troubleshooting process, allowing you to revisit previous steps, identify patterns, and avoid repeating unnecessary actions.

Future Reference: For recurring issues or similar problems encountered in the future, documented information serves as a valuable reference point, saving time and effort in troubleshooting.

What to Include in Your Problem Documentation:

Date and Time: Record the date and time the problem first occurred. This helps establish a timeline of events and identify any potential correlations with recent changes or updates.

Problem Description: Describe the issue in detail. Be specific about the symptoms you're experiencing.

What happens when the problem occurs? (e.g., System crashes, error messages appear, performance slows down)

Can you replicate the issue? If so, how?

Are there any specific actions or software programs that trigger the problem?

System Information: Include details about your computer system:

Operating System (e.g., Windows 10, macOS Monterey)

Hardware specifications (CPU, RAM, graphics card, storage)

Any relevant software versions (e.g., antivirus software, drivers)

Troubleshooting Steps Taken: Document the troubleshooting steps you've already attempted. This avoids redundant efforts and helps identify any potential mistakes made during the process.

List the specific tools used (diagnostic tools, software updates) and the results of those actions.

Error Messages (if applicable): Include the exact wording of any error messages displayed on the screen. Error codes can be particularly helpful in diagnosing the issue.

Screenshots (optional): If a visual representation of the problem is helpful (e.g., error message, unusual screen display), include screenshots in your documentation.

Self-Check Sheet 2: Identify the problem

1. My computer's acting weird. What should I check first before diving into software fixes?
2. Besides user manuals, what other documents might mention signs of trouble with my PC?
3. I'm not sure what's wrong with my PC, but the fans sound like a jet engine. What can I tell from that?
4. I noticed weird noises and checked the manual. Now what fancy tools can I use to diagnose the problem?
5. I've narrowed down the problem, but what if it happens again? Shouldn't I write all this down somewhere?

Answer Key 2: Identify the problem

1. My computer's acting weird. What should I check first before diving into software fixes?
Answer: Crack open the manual! Reviewing computer manuals can reveal common problems and troubleshooting steps specific to your model.
2. Besides user manuals, what other documents might mention signs of trouble with my PC?
Answer: Maintenance documents! These can provide detailed information on potential issues and how to identify them.
3. I'm not sure what's wrong with my PC, but the fans sound like a jet engine. What can I tell from that?
Answer: Your senses are key! Unusual noises like loud fans can indicate overheating, a problem physical observation can help detect.
4. I noticed weird noises and checked the manual. Now what fancy tools can I use to diagnose the problem?
Answer: Diagnostic tools! These software programs can test your hardware and pinpoint issues like memory problems or failing components.
5. I've narrowed down the problem, but what if it happens again? Shouldn't I write all this down somewhere?
Answer: Absolutely! Documenting the problem is crucial. It helps you track troubleshooting steps, remember error messages, and provides a reference point for future issues.

Task Sheet 2.1: Identifying the problem

Title: Identifying the problem
Performance Objective: At the end of this task, the trainee should be able to identify potential problems with your computer using a combination of resources and techniques.
1. Gather Information
2. Search the user manual for sections on troubleshooting common problems, error message explanations, or known issues related to your symptoms.
3. Review maintenance documents for diagnostic procedures or troubleshooting steps related to your problem description.
4. Physical Observation: <ul style="list-style-type: none">• Visual Inspection: Carefully examine your computer for any unusual signs:<ul style="list-style-type: none">• Cracks, discoloration, or loose connections on the case.• Excessive dust buildup on vents or fans.• Unusual blinking lights or error codes on the motherboard or power supply.• Damage to the monitor (cracks, dead pixels).• Touch: Feel the exterior of the computer case, especially around vents. Excessive heat might indicate overheating.• Listen: Pay attention to any abnormal noises like grinding fans, clicking sounds, or beeps during startup.
5. Based on your observations and suspected issue, choose appropriate diagnostic tools.
6. Run the chosen diagnostic tool and analyze the results.
7. Document the Identified Problem <ul style="list-style-type: none">• Create a document to record your findings.• Date and Time of the problem identification.• Detailed description of the issue (symptoms, error messages).• System information (OS, hardware specifications, relevant software versions).• Troubleshooting steps taken (manual review, physical observations, diagnostic tools used and their results).• Screenshots (optional) of error messages or unusual screen displays.

Learning Outcome 3: Identify the possible cause of fault

Assessment Criteria:

- 3.1 Appropriate person (if required) is consulted
- 3.2 Cause of fault is identified
- 3.3 Testing is performed to ensure the cause of fault
- 3.4 Repair or Replacement cost is calculated and approved from the appropriate person.

Content:

1. Consulting Appropriate person
2. Identifying Cause of fault
3. Testing cause of fault
4. Repair or Replacement cost

Resources Required/ Conditions:

The trainees must be provided with the following:

- Handouts or reference materials/books/ CBLMs on the above stated contents
- PCs/printers or laptop/printer with internet access
- Digital projector and Screen
- Bond paper
- Ball pens/pencils and other office supplies and materials
- Relevant learning materials
- Workplace or simulated environment

Methodologies

- Lecture/discussion
- Demonstration/application
- Presentation
- Blended delivery methods

Assessment Methods

- Written test
- Demonstration
- Observation with checklist
- Oral questioning
- Portfolio

Learning Experience 3: Use presentation application

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about Identifying the possible cause of fault	1. Instructor will provide the learning materials “Maintaining and Troubleshooting Personal Computer”
2. Read the Information sheet/s	2. Information Sheet No 3: Identifying the possible cause of fault
3. Complete the Self Checks & Check answer sheets.	3. Self-Check/s Self-Check No 3: Identifying the possible cause of fault Answer key No. 3: Identifying the possible cause of fault
4. Read the Job Sheet and Specification Sheet and perform job	Job- Sheet No 3-1: Identifying the possible cause of fault Specification Sheet 3-1: Identifying the possible cause of fault

Information Sheet 3: Identify the possible cause of fault

Learning Objectives:

After completion of this information sheet, the learners will be able to:

- 3.1 Consult Appropriate person (if required)
- 3.2 Identify Cause of fault
- 3.3 Perform Testing to ensure the cause of fault
- 3.4 Calculate and approve repair or Replacement cost is from the appropriate person.

3.1 Consulting the Appropriate Person to Identify the Cause of a Fault

When troubleshooting a problem, particularly with complex systems like computers or machinery, consulting the right person can significantly improve the efficiency and effectiveness of identifying the cause of the fault. Here's a breakdown of the steps involved in consulting the appropriate person:

Assess the Situation:

Nature of the Fault: Identify the type of problem you're encountering. Is it a software issue, hardware malfunction, or a network connectivity problem?

Severity of the Issue: Consider the severity of the fault. Is it a minor inconvenience or a critical issue that needs immediate attention?

Identify Potential Resources:

Internal Expertise: Within your organization or team, look for individuals with expertise related to the specific system experiencing the fault. This could include:

IT Support Staff: For computer and network-related issues, IT support personnel are trained to diagnose and resolve software and hardware problems.

System Administrators: They have in-depth knowledge of specific systems and can troubleshoot configuration issues, user access problems, and network connectivity.

Field Service Technicians: For complex machinery or equipment, qualified technicians have the skills and experience to physically diagnose and repair hardware faults.

External Resources: If internal expertise is limited, consider external options:

Manufacturer Support: Manufacturers often offer technical support for their products. Contacting the manufacturer can provide access to troubleshooting guides and dedicated support personnel familiar with the specific equipment.

Third-Party Service Providers: Independent service providers specialize in repairing and troubleshooting various technologies. They can be a valuable resource for complex issues.

Selecting the Appropriate Person:

Match Expertise to Fault: Choose the person whose expertise best aligns with the type of fault you're experiencing.

For software issues, consult IT support or system administrators.

For hardware malfunctions, contact field service technicians or manufacturer support.

Experience and Knowledge: Consider the experience level of the individual. Complex problems might require someone with advanced troubleshooting skills.

Availability: If immediate resolution is crucial, consider the availability of the person to address the issue promptly.

Effective Communication:

When contacting the chosen individual, provide a clear and concise description of the problem. Include details like:

- The type of system experiencing the fault.
- The specific symptoms you're observing.
- Any troubleshooting steps you've already attempted.
- If possible, share relevant background information about the system, recent changes made, or any error messages encountered.
- Actively listen to their questions and suggestions. A collaborative approach can lead to a faster diagnosis and resolution.

3.2 Identifying Cause of fault

Identifying the cause of a computer fault involves a systematic approach that combines information gathering, analysis, and potentially seeking external help. Here's a breakdown of the steps involved:

Gather Information:

- Talk to the person who encountered the problem. Ask detailed questions about:
 - The symptoms they're experiencing (crashes, slow performance, error messages).
 - When the issue started (after updates, specific actions).
 - Any recent changes made to the system (hardware or software installations).
- Look for physical signs of trouble:
 - Excessive dust buildup on vents.
 - Loose cables or malfunctioning fans.
 - Burnt components or damaged monitors.

Analyze the Information:

- Consult user manuals, online resources, or manufacturer support websites. Many common computer problems have documented solutions.
- Pay close attention to any error messages displayed on the screen. These messages often provide clues about the source of the problem. Research error codes online to understand their meaning.
- Consider the sequence of events leading up to the fault. Did the problem coincide with any software updates, hardware installations, or recent changes to the system configuration?

Utilize Tools and Techniques:

- Run diagnostic tools specific to the suspected issue.
- System monitoring tools can identify resource bottlenecks or overheating issues.
- Memory diagnostics can pinpoint RAM problems.
- Event Viewer (Windows) logs system events that might reveal software crashes or hardware errors.

- The sounds your computer makes can be informative. Grinding fans, beeping sounds during startup, or unusual clicking noises might indicate hardware malfunctions.

Consulting External Resources:

If the issue persists or seems complex, consider seeking help from:

- In an organizational setting, IT support personnel are trained to troubleshoot computer problems and have access to specialized tools and resources.
- Contacting the manufacturer of your computer or components (graphics card, motherboard) can provide access to troubleshooting guides and dedicated support personnel familiar with the specific equipment.
- Online communities and forums dedicated to computers can be a valuable resource. Search for discussions about similar issues and potential solutions from experienced users and professionals.

Testing cause of fault

Testing the cause of a computer fault involves methods to verify a suspected issue and isolate the root cause. It builds upon identifying the potential cause through information gathering and analysis. Here's how testing helps pinpoint the exact culprit:

a. Isolating the Suspect:

Once you've identified potential causes through the previous steps (user experience, analysis, tools), it's time to isolate the most likely culprit.

This might involve temporarily disabling specific software components or hardware features to see if the problem persists.

b. Targeted Testing:

- Based on the suspected cause, choose specific tests to verify its role in the fault:
- Running the problematic application in "safe mode" (loads only essential drivers and programs) can help determine if conflicts with other software are causing the issue.
- Uninstalling recently installed software or updates can isolate if they introduced the problem.
- Running memory diagnostics specifically tests your RAM for errors.
- Stress testing tools can put a heavy load on your CPU or GPU to see if overheating or instability is causing crashes.
- Disconnecting non-essential hardware like external drives can rule them out as the source of the problem.

c. Reproducing the Fault:

In some cases, you might be able to intentionally reproduce the fault by performing specific actions. This can help confirm that the issue is indeed related to those actions and narrow down the cause further.

d. Observing the Results:

- After performing targeted tests, carefully observe the system's behavior.
- Did disabling a specific software component resolve the issue?
- Did stress testing software trigger crashes or overheating?

- Did disconnecting a hardware component eliminate the fault?
- By analyzing the results of your tests, you can strengthen or weaken the case for your initial suspicion.

e. Iterative Process:

Testing the cause of a fault is often an iterative process.

If one test doesn't definitively pinpoint the issue, you might need to revisit the analysis stage, consider alternative causes, and design new tests based on those possibilities.

The key is to be methodical and document your findings at each stage (tests performed, results observed). This documentation helps you track your progress and avoid redundant testing.

3.3 Repair or Replacement cost

Once you've identified the cause of your computer fault, the next step is to decide whether repairing or replacing the entire system is the most cost-effective solution. Here's what you need to consider:

Repair Costs:

Cost of Parts: Research the cost of replacing the faulty component (RAM, hard drive, graphics card, etc.).

Consider both OEM (original equipment manufacturer) parts and compatible alternatives that might be cheaper.

Labor Costs: If you plan on professional repair, factor in the labor charges of the technician. Rates can vary depending on their expertise and location.

Repair Difficulty: Some repairs, like replacing RAM or storage drives, are relatively simple and can be done yourself if you're comfortable following instructions. However, complex repairs involving motherboard or CPU issues might require a professional's expertise.

Replacement Costs:

New Computer Cost: Research the current market price of a new computer with comparable specifications to your existing system.

Data Transfer: Consider the cost of data transfer services if you need to migrate your data from the old system to the new one.

Software Reinstallation: Factor in the cost of repurchasing or reinstalling any software licenses needed for your new system.

Additional Factors:

Age of your Computer: Generally, the older your computer, the less cost-effective repairs become. Replacement might be the better option for outdated systems.

Upgrade Potential: Consider if repairing the current fault allows for future upgrades. If not, a new computer might be a better long-term investment.

Warranty Coverage: Check if your computer or the faulty component is still under warranty. In such cases, repairs might be covered at minimal or no cost.

Resources for Cost Estimation:

Online Repair Shops: Many online repair shops allow you to submit your computer model and the suspected fault for a repair cost estimate.

Computer Part Retailers: Websites of major computer part retailers list component prices and can help you budget for repairs.

Manufacturer Support: Contacting your computer manufacturer directly might provide insights into repair costs or upgrade options.

Making the Decision:

Compare Costs: Weigh the estimated repair cost against the replacement cost of a new computer with similar capabilities.

Future Needs: Consider if the repaired system will meet your needs for a reasonable timeframe or if a new system offers better performance or upgrade potential.

Technical Expertise: If repairs involve complex components, factor in the cost and potential risks of DIY repairs versus professional help.

Self-Check Sheet 3: Identify the possible cause of fault

1. My computer's acting weird, but I'm not sure what's wrong. Should I call someone right away?
2. I narrowed down the issue to faulty RAM, but how can I be sure that's the real culprit?
3. The tests confirmed bad RAM, but fixing it seems expensive. Should I just get a new computer?
4. I compared costs and repairing the RAM seems reasonable, but who approves the final repair bill?
5. I decided to get the RAM replaced. Who should I consult to do the actual repair?

Answer Key 3: Identify the possible cause of fault

1. My computer's acting weird, but I'm not sure what's wrong. Should I call someone right away?

Answer: Not necessarily! Try identifying the cause yourself first. If the problem seems complex, then consulting a technician might be best.

2. I narrowed down the issue to faulty RAM, but how can I be sure that's the real culprit?

Answer: Testing is key! Run diagnostic software specifically designed to check your computer's memory for errors.

3. The tests confirmed bad RAM, but fixing it seems expensive. Should I just get a new computer?

Answer: Hold on! Before replacing the whole system, consider the repair vs. replacement cost.

Factor in the price of the RAM replacement and labor compared to the cost of a new computer with similar specs.

4. I compared costs and repairing the RAM seems reasonable, but who approves the final repair bill?

Answer: The decision often depends on your situation. If it's your personal computer, you get to approve the cost. In a company setting, there might be a designated person who authorizes repairs based on pre-approved budgets.

5. I decided to get the RAM replaced. Who should I consult to do the actual repair?

Answer: This depends on the complexity of the repair. If it's simple (like replacing RAM), you might be able to do it yourself following online guides. But for complex repairs, consult a qualified computer technician.

Task Sheet 3.1: Identify the possible cause of fault

Title: Identify the possible cause of fault
Performance Objective: By the end of this task, the trainee should be able to:
1. Look for physical signs of trouble like dust buildup, loose cables, or damaged components.
2. Pay close attention to any error messages displayed on the screen. Research error codes online to understand their meaning.
3. Run diagnostic tools specific to the suspected issue (e.g., memory diagnostics, system monitoring tools).
4. Based on your analysis, isolate the suspected culprit (software or hardware component).
5. Perform targeted tests to verify the suspected cause (e.g., safe mode testing for software conflicts, stress testing for hardware stability).
6. Based on your analysis, isolate the suspected culprit (software or hardware component).
7. Research the cost of replacing the component (RAM, hard drive, etc.). Consider both OEM and compatible parts.
8. If professional repair is needed, factor in the labor charges.
9. Compare the estimated repair cost against the replacement cost of a new computer.
10. Consider your computer's age, upgrade potential, and warranty coverage (if applicable).
11. Make an informed decision based on cost-effectiveness and your future computing needs.
12. Get Approval for Repair

Learning Outcome 4: Fix the problem

Assessment Criteria:

- 4.1 Faulty hardware equipment or software component is repaired or replaced
- 4.2 Repaired/replaced equipment is tested
- 4.3 Performance of PC is tested.

Content:

1. Repairing or replacing Faulty hardware equipment or software component
2. Testing Repaired/replaced equipment
3. Testing Performance of PC

Resources Required/ Conditions:

The trainees must be provided with the following:

- Handouts or reference materials/books/ CBLMs on the above stated contents
- PCs/printers or laptop/printer with internet access
- Digital projector and Screen
- Bond paper
- Ball pens/pencils and other office supplies and materials
- Relevant learning materials
- Workplace or simulated environment

Methodologies

- Lecture/discussion
- Demonstration/application
- Presentation
- Blended delivery methods

Assessment Methods

- Written test
- Demonstration
- Observation with checklist
- Oral questioning
- Portfolio

Learning Experience 4: Fix the problem

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about Fixing the problem	1. Instructor will provide the learning materials “Maintaining and Troubleshooting Personal Computer”
2. Read the Information sheet/s	2. Information Sheet No: 4 Fixing the problem
3. Complete the Self Checks & Check answer sheets.	3. Self-Check/s Self-Check No: 4 Fixing the problem Answer key No. 4 Fixing the problem
4. Read the Job Sheet and Specification Sheet and perform job	4. Job- Sheet No: 4 Fixing the problem Specification Sheet: 4 Fixing the problem

Information Sheet 4: Fixing the problem

Learning Objectives:

After completion of this information sheet, the learners will be able to:

- 4.1 Repair or replace Faulty hardware equipment or software component
- 4.2 Test Repaired/replaced equipment
- 4.3 Test Performance of PC

4.1 Repairing or Replacing Faulty Hardware Equipment or Software Components

When your computer malfunctions, you're faced with a decision: repair the existing equipment or replace the entire system. This choice hinges on several factors, including the nature of the fault, the cost-effectiveness of repairs, and your future computing needs. Here's a breakdown of both options:

Repairing Faulty Hardware:

Pros:

Cost-effective: Repairing a single faulty component can be significantly cheaper than replacing the entire computer.

Environmentally friendly: Reusing existing hardware reduces electronic waste.

Data Retention: You avoid the hassle of data transfer and software reinstallation on a new system.

Cons:

Limited Scope: Fixes only the immediate problem. Other underlying issues might remain.

Skill Level Required: Simple repairs like replacing RAM might be DIY-friendly, but complex repairs might require a technician's expertise.

Warranty Coverage: Repairs might not be covered under warranty if the fault isn't a manufacturing defect.

When to Consider Repair:

Simple Hardware Issues: Replacing RAM, storage drives, or power supplies are often relatively simple repairs.

Warranty Coverage: If the faulty component is under warranty, repairs might be covered at minimal or no cost.

Newer Systems: For newer computers, repairing a single component is usually more cost-effective than replacing the entire system.

4.2 Replacing Faulty Hardware:

Pros:

Fresh Start: A new computer provides the latest hardware and improved performance.

Future-Proofing: You get a system that can handle your evolving computing needs for a longer period.

Warranty Coverage: New computers come with warranties, offering peace of mind in case of future malfunctions.

Cons:

Cost: Replacing the entire system can be significantly more expensive than repairing a single component.

Data Transfer: You need to migrate your data and reinstall software on the new computer.

Environmental Impact: Replacing a functional system contributes to electronic waste.

When to Consider Replacement:

Multiple Hardware Issues: If multiple components are failing, repairing them all might be less cost-effective than replacement.

Outdated System: For very old computers, a new system will offer significant performance improvements and compatibility with modern software.

Upgrade Potential: If your current system lacks the capacity for future upgrades, replacing it might be the better long-term solution.

Repairing Faulty Software:**Pros:**

Often Free or Low Cost: Many software issues can be resolved by troubleshooting steps, updates, or readily available online solutions.

Data Retention: Your data and settings remain intact on your existing system.

Cons:

Time-Consuming: Troubleshooting software issues can be time-consuming, especially for complex problems.

Data Loss Risk: In rare cases, severe software problems might lead to data loss.

When to Consider Software Repair (troubleshooting):

Software Crashes: These can often be fixed by updates, reinstalling the program, or resolving conflicts with other software.

Performance Issues: Optimizing software settings, removing unnecessary programs, or cleaning up temporary files can often improve performance.

Malware Infections: Antivirus software and anti-malware tools can be used to scan and remove malicious software from your system.

Making the Choice:

Evaluate the Cost: Compare the estimated repair cost to the price of a new computer with similar specifications.

Consider Your Needs: Think about your current and future computing needs. Will a repaired system suffice or do you need the performance boost and upgrade potential of a new one?

Technical Expertise: Assess your comfort level with repairs. If the fix is complex, seek professional help or consider replacement if the cost difference is minimal.

Testing Repaired/Replaced Equipment: Ensuring Functionality and Stability

Once you've opted for repairing a faulty component or replacing the entire computer, testing the repaired/replaced equipment is crucial. This process verifies functionality, ensures the problem is resolved, and identifies any potential issues introduced during the repair or replacement process.

Testing Repaired Hardware:

Boot Up and Basic Functionality:

Power on the computer and observe the boot process. Does it complete successfully without errors?

Verify basic functionality like keyboard, mouse, and display are working correctly.

Targeted Testing:

Depending on the repaired component, perform specific tests to ensure it's functioning properly:

Memory Replacement: Run memory diagnostic tools again to confirm no errors are detected.

Storage Drive Replacement: Test data transfer, file access, and system performance to ensure the new drive is working as expected.

Graphics Card Replacement: Run graphics-intensive applications or benchmarks to verify proper video output and performance.

Stress Testing:

Consider running stress testing software to put a load on the system and identify any potential stability issues that might not occur during regular use. This is particularly important if the repair involved thermal management components (e.g., fans, heat sinks).

Testing Replaced Equipment:

Initial Setup:

Follow the setup instructions for the new computer, including operating system installation and driver updates.

Hardware Functionality:

Verify that all hardware components (ports, USB devices, Wi-Fi) are recognized and functioning correctly.

Software Compatibility:

Test your essential software applications to ensure they run smoothly on the new system. Update or reinstall any software that encounters compatibility issues.

Data Transfer (if applicable):

If you transferred data from your old system, verify that all files and applications are accessible and functional on the new computer.

General Testing Considerations:

Visual Inspection: After repairs or replacement, check for any loose cables, improper component placement, or signs of physical damage that might have occurred during the process.

Documentation: Refer to any documentation provided with the repaired component or new computer. This might include specific testing instructions or warranty information.

Backup: Before any testing, especially after repairs that might involve data loss risks, ensure you have a recent backup of your important files.

4.3 Testing Performance of Your PC: Evaluating Speed, Stability, and Capabilities

Testing your PC's performance helps you understand its current capabilities, identify potential bottlenecks, and determine if an upgrade might be necessary. Here's a breakdown of different approaches to testing PC performance:

1. Basic Performance Monitoring:

Task Manager (Windows): This built-in tool provides real-time information on CPU usage, memory utilization, disk activity, and network performance.

Monitor these metrics while running demanding tasks like video editing or gaming to identify resource bottlenecks (e.g., high CPU usage during video editing might indicate a CPU upgrade could improve performance).

Activity Monitor (Mac): Similar to Task Manager, this tool on Mac systems shows CPU, memory, energy, disk, and network usage. Use it to monitor resource utilization during demanding tasks.

2. Benchmarking Software:

Benchmarking software simulates real-world workloads and generates scores that reflect your system's performance in areas like CPU processing power, graphics processing, and overall system speed.

Popular options include:

Cinebench R23: Focuses on CPU performance.

3DMark: Tests graphics processing and overall system performance for gaming.



CrystalDiskMark: Measures storage drive read/write speeds.

Compare your benchmark scores with published results for similar hardware configurations to understand how your system stacks up against others.

All	Read (MB/s)	Write (MB/s)
SEQ1M Q8T1	7440.26	6794.82
SEQ128K Q32T1	7405.82	6802.87
RND4K Q32T16	4691.78	3877.01
RND4K Q1T1	68.10	148.10

Samsung SSD 990 PRO 2TB + AMD Ryzen 9 TR 5995WX

3. Real-World Testing:

Run demanding applications you typically use on your PC (e.g., video editing software, games) and observe performance.

Pay attention to factors like:

Loading times: How long does it take for applications to launch?

Frame rates: In games, are you experiencing smooth gameplay without stuttering or lag?

Responsiveness: Does your computer react quickly to your actions without delays?

4. Stress Testing:

Stress testing software puts a heavy load on your CPU, GPU, and memory to identify potential stability issues. By pushing the system to its limits, you can uncover issues that might not occur during normal use.

Popular stress testing tools include:

Prime95: Puts a heavy load on your CPU.

FurMark: Stress tests your graphics card.

Monitor your system's behavior during stress testing. Are there any crashes, overheating issues, or unusual behavior? Such issues might necessitate upgrades to cooling systems or specific components.

Interpreting Performance Test Results:

Benchmark scores provide a relative comparison. Higher scores generally indicate better performance. However, consider the specific software used and its focus (CPU, GPU, overall system).

Real-world testing is crucial. Benchmark scores are valuable, but real-world use cases are most relevant to your experience.

Identify bottlenecks: Performance testing helps pinpoint limitations. If your CPU usage is maxed out during video editing while your GPU remains underutilized, a CPU upgrade might offer the most significant performance boost.

Self-Check Sheet 4: Fixing the problem

1. What factors should be considered when deciding whether to repair or replace faulty hardware equipment or software components?
2. How can you ensure the reliability of repaired or replaced equipment?
3. What are some common methods for testing repaired or replaced hardware equipment?
4. How can you evaluate the performance of a PC after repairing or replacing components?
5. Why is it important to test the performance of a PC after repairs or replacements?

Answer Key 4: Fixing the problem

1. What factors should be considered when deciding whether to repair or replace faulty hardware equipment or software components?
Answer: Consider factors like cost-effectiveness, compatibility with existing systems, availability of replacement parts, and the extent of damage or obsolescence.
2. How can you ensure the reliability of repaired or replaced equipment?
Answer: Thoroughly test the functionality of the repaired or replaced components, checking for any recurring issues and ensuring they meet performance standards.
3. What are some common methods for testing repaired or replaced hardware equipment?
Answer: Conducting diagnostic tests, running stress tests to assess stability under heavy loads, and performing functionality checks to verify proper operation.
4. How can you evaluate the performance of a PC after repairing or replacing components?
Answer: Measure performance metrics such as processing speed, memory usage, and overall system responsiveness using benchmarking software or performance monitoring tools.
5. Why is it important to test the performance of a PC after repairs or replacements?
Answer: Testing ensures that the PC functions optimally, minimizing the risk of future malfunctions or performance issues, and ultimately enhancing user satisfaction and productivity.

Task Sheet 4.1: Fixing the problem

Title: Repair, Replace, and Test Hardware and Software Components
Performance Objective: By the end of this task, the trainee should be able to Determine the source of malfunctioning hardware equipment or software components.
1. Conduct a thorough inspection of the hardware and software components.
2. Gather user reports or logs indicating issues.
3. Use diagnostic tools to pinpoint faulty components.
4. Consult with relevant stakeholders to gather additional information.
5. Evaluate the extent of damage or malfunction.
6. Consider the cost-effectiveness of repair versus replacement.
7. Assess compatibility with existing systems and future needs.
8. Consult with relevant experts or vendors if needed.
9. Perform necessary repairs using appropriate tools and techniques.
10. Replace components if repair is not feasible or cost-effective.
11. Ensure proper installation and configuration of replacement parts.
12. Document all actions taken for future reference.
13. Conduct comprehensive functionality tests to ensure proper operation.
14. Run diagnostic tests to detect any residual issues or potential conflicts.
15. Validate compatibility with existing systems and software.
16. Solicit feedback from users to confirm satisfactory performance.
17. Monitor system stability under various workloads and usage scenarios.

Learning Outcome 5: Update document

Assessment Criteria:

- 5.1 Computer maintenance and troubleshooting status are documented
- 5.2 Documented status is reported to the authority

Content:

1. Documenting Computer maintenance and troubleshooting status
2. Reporting Documented status to the authority

Resources Required/ Conditions:

The trainees must be provided with the following:

- Handouts or reference materials/books/ CBLMs on the above stated contents
- PCs/printers or laptop/printer with internet access
- Digital projector and Screen
- Bond paper
- Ball pens/pencils and other office supplies and materials
- Relevant learning materials
- Workplace or simulated environment

Methodologies

- Lecture/discussion
- Demonstration/application
- Presentation
- Blended delivery methods

Assessment Methods

- Written test
- Demonstration
- Observation with checklist
- Oral questioning
- Portfolio

Learning Experience 5: Update document

In order to achieve the objectives stated in this learning guide, you must perform the learning steps below. Beside each step are the resources or special instructions you will use to accomplish the corresponding activity.

Learning Steps	Resources specific instructions
1. Student will ask the instructor about updating document	1. Instructor will provide the learning materials “Maintaining and Troubleshooting Personal Computer”
2. Read the Information sheet/s	2. Information Sheet No: 5 Use internet to access information
3. Complete the Self Checks & Check answer sheets.	3. Self-Check/s Self-Check No: 5 Updating document Answer key No. 5 Updating document
4. Read the Job Sheet and Specification Sheet and perform job	4. Job- Sheet No: 5 Updating document Specification Sheet: 5 Updating document

Information Sheet 5: Updating document

Learning Objectives:

After completion of this information sheet, the learners will be able to:

- 5.1 Document Computer maintenance and troubleshooting status
- 5.2 Report Documented status to the authority.

5.1 Document Computer maintenance and troubleshooting status

Documenting computer maintenance and troubleshooting status involves keeping detailed records of all actions taken to maintain and troubleshoot computer systems, hardware, and software. This documentation serves several important purposes:

Track Maintenance History: By documenting maintenance activities such as hardware upgrades, software installations, and system optimizations, you create a history of the computer's maintenance status. This history helps in tracking the lifespan of components, identifying recurring issues, and planning future maintenance tasks.

Troubleshooting Records: Documenting troubleshooting efforts, including the symptoms observed, diagnostic tests performed, and solutions implemented, helps in understanding the root causes of problems and identifying trends or patterns in system issues. It enables technicians to efficiently address similar issues in the future and avoid redundant troubleshooting steps.

Compliance and Auditing: Maintaining detailed records of computer maintenance and troubleshooting activities ensures compliance with organizational policies, industry regulations, and quality standards. These records may be required for auditing purposes to demonstrate adherence to best practices and regulatory requirements.

Knowledge Transfer: Documentation serves as a valuable resource for transferring knowledge and expertise within an organization. New technicians can refer to past maintenance and troubleshooting records to understand the configuration and history of computer systems, accelerating their learning curve and improving their effectiveness in resolving issues.

Performance Analysis: Analyzing maintenance and troubleshooting records can provide insights into the performance and reliability of computer systems over time. By tracking metrics such as system uptime, response times, and resolution rates, organizations can identify areas for improvement and optimize their maintenance processes to enhance overall system performance.

Risk Management: Documenting computer maintenance and troubleshooting status helps in identifying potential risks and vulnerabilities in IT infrastructure. By maintaining an accurate record of past issues and their resolutions, organizations can proactively mitigate risks, implement preventive measures, and enhance the resilience of their computer systems.

Reporting the documented status of computer maintenance and troubleshooting to the authority involves conveying detailed information about the actions taken, issues encountered, and resolutions implemented to ensure the smooth functioning of computer systems within an organization. Here's how this process can be approached:

Compile Maintenance and Troubleshooting Records: Gather all relevant documentation related to computer maintenance and troubleshooting activities. This includes records of scheduled maintenance tasks, unscheduled repairs, software updates, hardware replacements, and any troubleshooting efforts undertaken to resolve issues.

Summarize Maintenance and Troubleshooting Activities: Provide a summary of the maintenance and troubleshooting activities conducted during the reporting period. Highlight key metrics such as the number of maintenance tasks completed, the types of issues encountered, and the time taken to resolve them.

Identify Trends and Patterns: Analyze the documented data to identify any trends or patterns in computer maintenance and troubleshooting. This may include recurring issues, common causes of failures, or areas where improvements can be made to enhance system reliability and performance.

Assess System Performance: Evaluate the performance of computer systems based on the documented maintenance and troubleshooting activities. Assess metrics such as system uptime, response times, error rates, and user satisfaction to gauge the overall health of the IT infrastructure.

Highlight Achievements and Challenges: Showcase the achievements and successes in maintaining and troubleshooting computer systems, such as reducing downtime, improving response times, or implementing preventive measures to mitigate future issues. Also, identify any challenges or obstacles faced during the reporting period and the strategies employed to overcome them.

Provide Recommendations: Offer recommendations to address any identified shortcomings or areas for improvement in computer maintenance and troubleshooting. These recommendations may include process improvements, technology upgrades, training initiatives, or resource allocations to enhance the effectiveness and efficiency of IT operations.

Present in a Clear and Concise Format: Present the documented status in a clear and concise format that is easily understandable to the authority. Use charts, graphs, tables, and other

visual aids to illustrate key findings and trends, and provide explanations or annotations where necessary to add context.

Engage in Discussion: Engage in a discussion with the authority to review the reported status, address any questions or concerns they may have, and solicit feedback on the recommendations provided. Encourage open communication and collaboration to ensure alignment between IT goals and organizational objectives.

Document Decisions and Action Plans: Document any decisions made by the authority in response to the reported status, as well as the action plans for implementing recommended changes or improvements. Ensure that responsibilities are assigned, timelines are established, and progress is monitored to track the implementation of agreed-upon initiatives.

Follow-Up and Review: Follow up with the authority periodically to provide updates on the progress of action plans, address any new developments or issues that arise, and review the ongoing status of computer maintenance and troubleshooting efforts. Iterate on the reporting process based on feedback received and lessons learned to continuously improve IT operations.

Self-Check Sheet 5: Updating document

1. Why is it important to document computer maintenance and troubleshooting status?
2. What type of information should be included in documenting computer maintenance and troubleshooting status?
3. How does documenting computer maintenance and troubleshooting status benefit organizations?
4. What is the purpose of reporting documented status to the authority?
5. How should documented status be presented to the authority?

Answer Key 5: Updating document

1. Why is it important to document computer maintenance and troubleshooting status?
Answer: Documenting maintenance and troubleshooting status helps track activities, identify trends, and improve system reliability by learning from past experiences.
2. What type of information should be included in documenting computer maintenance and troubleshooting status?
Answer: Information such as maintenance tasks performed, issues encountered, resolutions implemented, system performance metrics, and recommendations for improvement should be documented.
3. How does documenting computer maintenance and troubleshooting status benefit organizations?
Answer: It provides a historical record for reference, aids in identifying areas for improvement, facilitates compliance with regulations, and enhances accountability in IT operations.
4. What is the purpose of reporting documented status to the authority?
Answer: Reporting to the authority ensures transparency, enables informed decision-making, aligns IT activities with organizational goals, and fosters accountability for maintaining and troubleshooting computer systems.
5. How should documented status be presented to the authority?
Answer: Documented status should be presented in a clear and concise format, highlighting key findings, trends, challenges, and recommendations, and accompanied by visual aids to facilitate understanding and decision-making.

Review of Competency

Below is yourself assessment rating for module “**Maintaining and Troubleshooting Personal Computer**”

SL no	Assessment of performance Criteria	Yes	No
1.	Required tools and equipment's are selected and collected for troubleshooting		
2.	Appropriate person is interviewed about the problem		
3.	Computer manuals and maintenance documents are reviewed		
4.	Problems are detected through physical observation		
5.	Problems are detected using diagnostic tools		
6.	Identified problems are documented		
7.	Appropriate person (if required) is consulted		
8.	Cause of fault is identified		
9.	Testing is performed to ensure the cause of fault		
10.	Repair or Replacement cost is calculated and approved from the appropriate person		
11.	Faulty hardware equipment or software component is repaired or replaced		
12.	Repaired/replaced equipment is tested		
13.	Performance of PC is tested		
14.	Computer maintenance and troubleshooting status are documented		
15.	Documented status is reported to the authority		
16.	Computer maintenance and troubleshooting status are documented		

I now feel ready to undertake my formal competency assessment.

Signed:

Date:

Development of CBLM

The Competency based Learning Material (CBLM) of ‘**Maintaining and Troubleshooting Personal Computer**’ (Occupation: **IT Support Service, Level-3**) for National Skills Certificate is developed by NSDA with the assistance of SIMEC System Ltd., ECF Consultancy & SIMEC Institute of Technology JV (Joint Venture Firm) in the month of June, 2024 under the contract number of package SD-9B dated 15th January 2024.

SL No.	Name & Address	Designation	Contact Number
1	Mir Rashedul Islam	Writer	01920576687
2	Md. Zuwel Parves	Editor	01737-278906
3	Md. Zuwel Parves	Co-Ordinator	01737-278906
4	Md. Saif Uddin	Reviewer	01723-004419

Reference:

1. <https://chat.openai.com/>
2. <https://gemini.google.com/>