



**BAHIR DAR UNIVERSITY**

**BAHIRDAR INSTITUTE OF TECHNOLOGY (BIT)**

**FACULTY OF COMPUTING**

**DEPARTMENT OF INFORMATION TECHNOLOGY (ITBED)**

**OPERATING SYSTEM PROJECT WORK**

**Operating System: Window 11**

**Year: 3rd Year (2018 E.C)**

**Name**

**ID Number**

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*Submitted to: Lec. Wendimu*

# 1. Introduction

- An operating system (OS) is the core software that manages computer hardware and software resources and provides essential services for computer programs. Windows 11 is a modern operating system developed by Microsoft, designed to improve security, performance, and user experience. This project focuses on the installation and study of Windows 11 using a virtual environment to safely explore operating system concepts without affecting physical hardware.
- Virtualization allows multiple operating systems to run on a single physical machine, making it an effective learning tool for students. Through this project, theoretical knowledge such as booting, file systems, memory management, and CPU scheduling is applied practically.

## 2. OBJECTIVES

The objectives of this project are:

- To understand the concept and functionality of Windows 11
- To gain practical experience installing an operating system in a virtual environment
- To understand hardware and software requirements of Windows 11
- To learn about file system support in Windows 11
- To identify common installation problems and their solutions
- To understand the role of virtualization in modern operating systems

## 3. REQUIREMENTS

### 3.1 Hardware Requirements

- 64-bit processor (Intel 8th generation or newer / AMD Ryzen 2000 series or newer)
- Minimum 4 GB RAM
- Minimum 64 GB storage
- TPM 2.0 support
- UEFI firmware with Secure Boot

### 3.2 Software Requirements

- Windows 11 ISO file (64-bit)
- Oracle VM VirtualBox or VMware Workstation
- Host operating system (Windows 10/11 or Linux)
- Enabled virtualization technology (Intel VT-x / AMD-V)

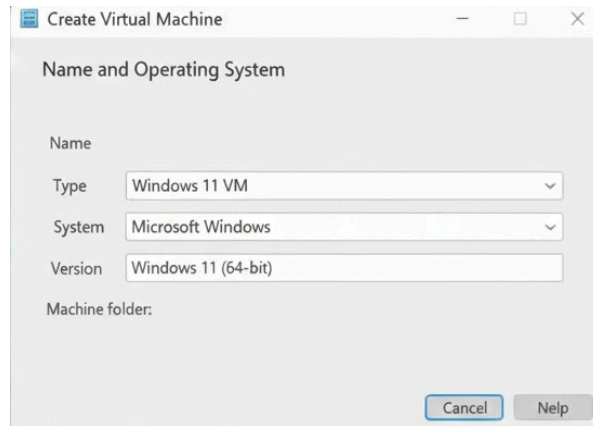
## 4. INSTALLATION STEPS (VIRTUAL ENVIRONMENT)

### Step 1: Install Virtualization Software

Download and install Oracle VM VirtualBox or VMware Workstation on the host computer.

## Step 2: Create a New Virtual Machine

- Open the virtualization software
- Click "New"
- Name the virtual machine using your full name
- Select type: Microsoft Windows
- Version: Windows 11 (64-bit)



## Step 3: Allocate Resources

- Memory: Allocate at least 4 GB RAM
- CPU: Allocate at least 2 cores
- Storage: Create a virtual disk with minimum 64 GB

## Step 4: Attach Windows 11 ISO

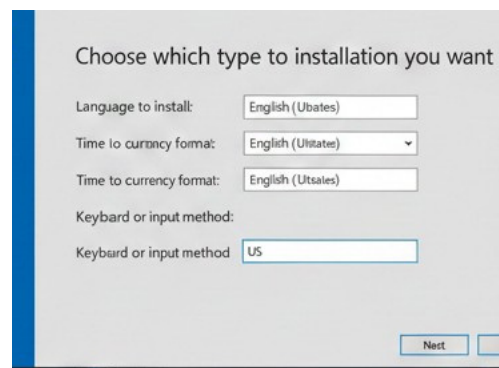
- Select the Windows 11 ISO file as the boot disk
- Enable TPM and Secure Boot if required

## Step 5: Install Windows 11

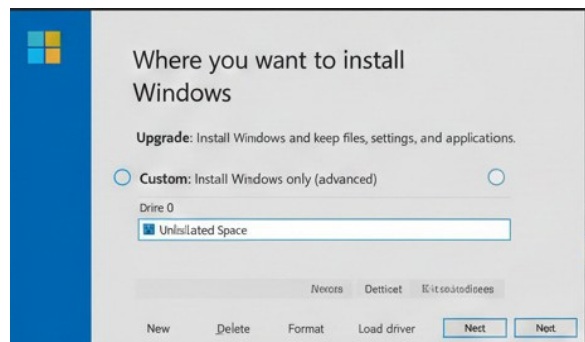
- Start the virtual machine



- Follow on-screen instructions
- Select language, time, and keyboard



- Choose "Custom Installation"



- Select the virtual disk
- Continue installation

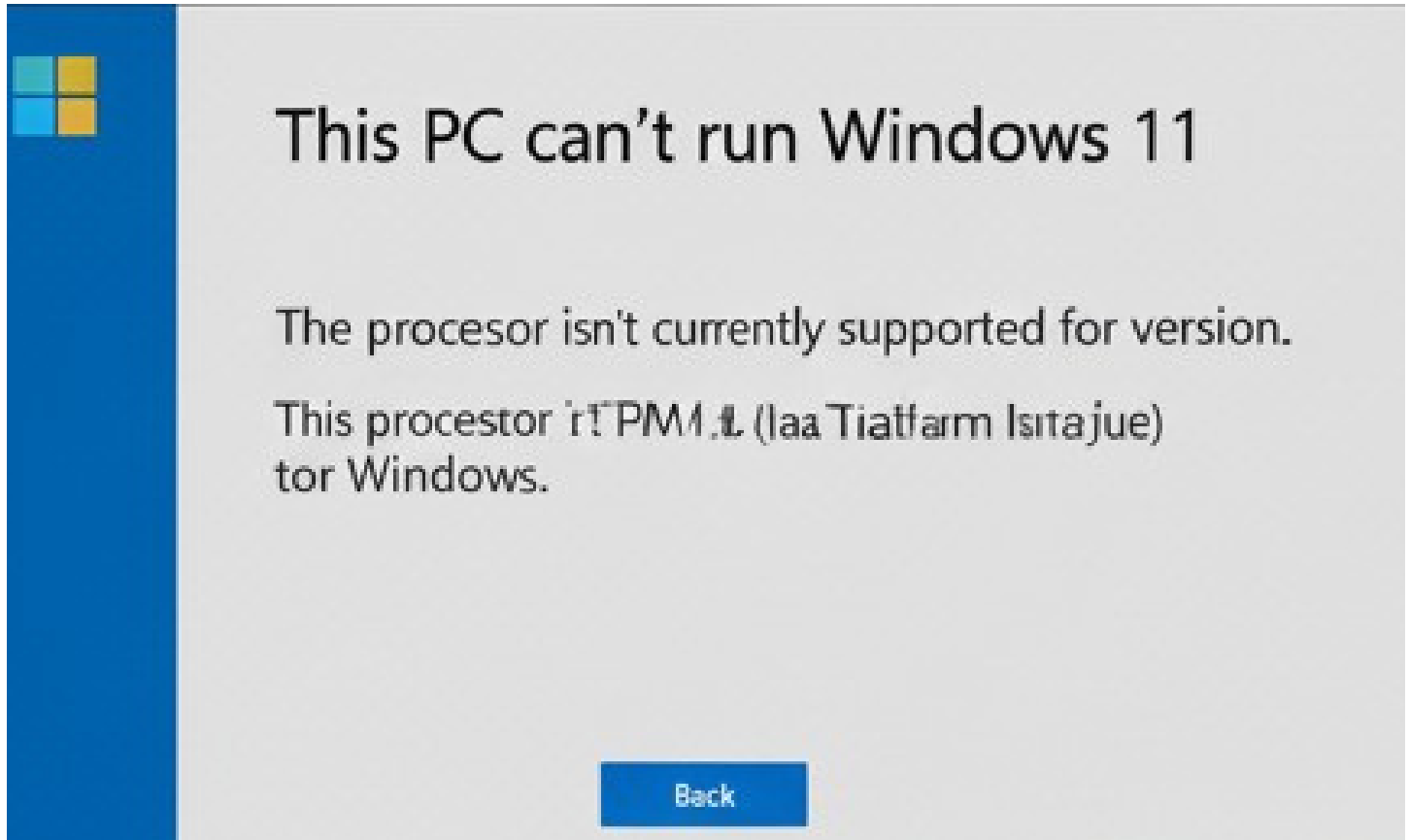


## Step 6: User Account Creation

Create a user account using your **full name** as required.

## 5. ISSUES FACED DURING INSTALLATION

- TPM 2.0 requirement error
- Secure Boot disabled error
- Virtualization disabled in BIOS
- Unsupported CPU message
- The main challenges faced to my project was the accessibility of the computer resources that means in our computer lab the desktop is limited and old generation but, window 11 is not support old generation, it supported from intel core i3 8<sup>th</sup> generation so, I can not install that operating system by existing resource.



## 6. SOLUTIONS

- Enable TPM and Secure Boot from virtualization settings
- Enable Intel VT-x or AMD-V in BIOS
- Update virtualization software to the latest version
- Apply supported configuration settings for Windows 11

## 7. FILE SYSTEM SUPPORT

Windows 11 supports the following file systems:

- **NTFS (Default and Recommended)**
- FAT32
- exFAT

**NTFS** is preferred because it supports security permissions, large file sizes, encryption, compression, and system reliability.

## **8. ADVANTAGES AND DISADVANTAGES**

### **Advantages**

- Modern and user-friendly interface
- Enhanced security features
- Better performance on new hardware
- Strong virtualization support

### **Disadvantages**

- Requires modern hardware
- Does not support older CPUs
- TPM 2.0 requirement limits compatibility

## **9. VIRTUALIZATION IN MODERN OPERATING SYSTEMS**

### **What is Virtualization?**

Virtualization is the technology that allows multiple operating systems to run on a single physical machine.

### **Why Virtualization?**

- Cost-effective
- Safe testing environment
- Efficient resource utilization
- Supports learning and development

### **How Virtualization Works?**

A hypervisor manages hardware resources and allows virtual machines to operate independently.

## **10. CONCLUSION**

This project provided practical experience in installing and understanding Windows 11 using a virtual environment. It enhanced understanding of operating system concepts, virtualization technology, and system requirements. Windows 11 proves to be a secure and efficient operating system suitable for modern computing environments.

## **11. FUTURE OUTLOOK / RECOMMENDATIONS**

- Improve compatibility with older hardware
- Enhance customization options
- Further optimize performance for virtual environments
- Continue improving security features

