BAHIRDAR UNIVERSITY INSTITUTIONS TECHNOLOGY

FACILITY OF COMPUTING

DEPARTMENT OF ITBED

COURSES NAME :OPERATING SYSTEM

PROJECT 1, OPERATING SYSTEM: DYSON

2,WORLDWIDE MOBILE PHONE BRAND :BLACKVIEW

3,WORLDWIDE PC BRAND :TONGFAG

NAME MEKONEN ASNKO ID 1602028

- : Dyson is a multinational technology company founded by Sir James Dyson in 1991, best known for its vacuum cleaners, air purifiers, and hair care devices. In the context of your operating systems course, Dyson appliances are excellent case studies of embedded operating systems—small, specialized OS software that controls sensors, motors, and connectivity inside smart devices.1. THERE IS NO "DYSON OPERATING SYSTEM" FOR PCs
- Dyson does not make a computer operating system. They make:

- · ✅ Vacuum cleaners
- · ✅ Air purifiers
- · ✅ Hair dryers
- · ✅ Fans
- · ❌ NOT computer software for Windows/Mac

🏛️ **History of Dyson**

- 1978: James Dyson grew frustrated with traditional vacuum cleaners losing suction. He applied the principle of industrial cyclones to separate dust without a bag.
- 1983–1991: After 5,127 prototypes, Dyson launched the first bagless vacuum cleaner, the “G-Force,” in Japan. It became a status symbol and won the 1991 International Design Fair prize.1991: Dyson Limited was officially founded in Malmesbury, England.2000s–Present: Expanded into air purifiers, bladeless fans, hand dryers, hair dryers, and lighting. Headquarters moved to Singapore in 2019.
- 2023: Dyson reported revenue of £7.1 billion and employs about 14,000 people worldwide.
- Cyclone Technology: Uses centrifugal force to separate dust and particles from air.
- Digital Motors: High-speed, brushless motors provide powerful suction and airflow.
- Sensors: Detect air quality, dust levels, or hair moisture.
- Connectivity: Smart Dyson devices connect to apps for monitoring and control.

📲 **Embedded Operating Systems in Dyson Products**

- Dyson appliances rely on embedded OS software to manage hardware efficiently:
- Real-Time OS (RTOS): Ensures precise timing for motor control and sensor feedback.
- Firmware: Controls basic functions like fan speed, suction power, and filter monitoring.
- IoT Integration: Embedded OS enables Wi-Fi/Bluetooth connectivity for mobile apps.
- Security: OS ensures safe updates and prevents unauthorized access.
- Installation & Usage of Embedded OS
- Pre-installed Firmware: Dyson devices come with embedded OS already installed at the factory.

- Updates: Delivered via mobile apps or over-the-air (OTA) updates.
- User Interaction: Customers don't install the OS themselves; they interact through buttons, touchscreens, or apps.
- Developer Aspect: Engineers flash firmware onto microcontrollers during production using specialized t
- Dyson as a case study of embedded operating systems in consumer technology.Importance of OS in smart appliances.
- Origin story (bagless vacuum invention).
- Expansion into multiple product categories.
- Current global status.
- . Technical Functioning Cyclone separation, digital motors, sensors.
- Embedded OS role in controlling these components.
- Embedded OS Details
- RTOS for real-time control.Firmware updates and IoT connectivity.
- Security and modularity.

  Engineering installation during manufacturing.
- Dyson demonstrates how embedded operating systems power modern smart appliances.
- Links between OS theory (process scheduling, I/O management) and real-world consumer devices.
- Aspect Dyson Appliances Example OS Concept Link
- Hardware Control Digital motors, sensors Process scheduling, I/O management
- Real-Time Response Air quality detection Real-Time OS (RTOS)
- Connectivity Dyson Link app Networking stack in OS
- Updates OTA firmware updates OS patching & security

  User Interface Buttons, touchscreens OS abstraction layer

✅ Takeaway: Dyson isn't an OS concept itself, but its appliances are powered by embedded

operating systems.

- 🚫 No, you cannot install a “Dyson operating system” on Windows 11.
- 🖥️Why Not installation Dyson?
- Dyson doesn’t make a general-purpose OS: Dyson is a company that builds appliances (vacuum cleaners, air purifiers, hair dryers, etc.). Their devices use embedded operating systems (firmware or real-time OS) designed specifically for the hardware inside those machines.
- Embedded OS ≠ Desktop OS:
- Embedded OS runs on microcontrollers inside devices.
- Windows 11 is a full-featured desktop operating system for PCs.
- They are built for completely different environments and cannot be swapped.
- Compatibility Issues: Dyson’s firmware is tightly coupled with sensors, motors, and IoT modules in their appliances. It has no drivers, user interface, or support for PC hardware.
- How Dyson OS Works (in appliances)
- Pre-installed at the factory on microcontrollers.
- Manages real-time tasks like motor speed, airflow, and sensor readings.
- Provides connectivity (Wi-Fi/Bluetooth) for the Dyson Link app.Updated via firmware updates, not user installation.
- 🛑Core Reasons
- 1. TECHNICAL/ARCHITECTURAL REASONS
- Hardware Incompatibility:
- · Dyson Device Hardware: Uses ARM/RISC-based microcontrollers (e.g., STM32, ESP32 chips)
- · PC Hardware: Uses x86/x64 architecture (Intel/AMD processors)
- · Result: Software compiled for ARM cannot run on x86 without binary translation/emulation

Embedded vs General-Purpose:

- · Dyson Firmware: Bare-metal/RTOS designed for specific sensors/motors
- · PC OS: Windows/Linux designed for general computing
- · Example: Dyson software expects specific motor control pins that don't exist on PC motherboards
- FUNCTIONAL/PURPOSE REASONS

- Dyson "OS" Functions vs PC Needs:

- Dyson Firmware Function Why It Won't Work on PC
- Brushless DC motor control PC has no vacuum motor to control
- Laser distance sensor reading No sensor hardware connected
- HEPA filter monitoring No filter hardware exists
- Battery management No Dyson battery connected
- Wi-Fi to Dyson cloud Would connect but no device to control
- · A car's ABS braking software on a bicycle
- · A microwave's magnetron controller on a toaster
- · An elevator's floor control system in a house
- PRACTICAL/LOGISTICAL REASONS
- No Installation Mechanism:
- · Dyson doesn't provide PC installers (.exe/.msi)
- · No device drivers for Windows
- · No bootable ISO for installation
- · No installation wizard, setup, or documentation
- Source Code Unavailable:from website

- Dyson's firmware is proprietary, closed-source
- · Even if you had source code, it wouldn't compile for PC
- · No cross-compilation toolchain provided
- LEGAL/COMPANY POLICY REASONS
- Dyson's Business Model:
- · Sells hardware appliances, not software licenses
- · Firmware is device-locked, not transferable
- 1. Different Purpose
- Dyson OS (firmware/embedded OS): Designed only to control Dyson appliances (motors, sensors, airflow, connectivity).
- Windows 11: A general-purpose desktop OS for PCs, supporting multitasking, applications, and user interfaces.
- ➡ They serve completely different roles — one is appliance-specific, the other is universal computing.
- 2. Hardware Incompatibility
- Dyson OS runs on microcontrollers and specialized chips inside vacuums or purifiers.
- Windows 11 runs on x86/x64 processors (Intel, AMD) or ARM chips in PCs.
- ➡ Dyson OS has no drivers or support for PC hardware like GPUs, keyboards, or storage.
- 3. No User Installation
- Dyson OS is pre-installed at the factory.
- Updates are delivered via firmware patches or over-the-air (OTA) through the Dyson app.
- Users cannot download or install it like Windows or Linux.
- ➡ It's locked to the device it was built for.
- 4. Minimal Functionality

- Dyson OS only manages specific tasks: motor speed, sensor readings, Wi-Fi connection.
- Windows 11 supports complex multitasking, file systems, GUIs, and millions of apps.
- ➡ Dyson OS doesn't even have a desktop interface — it's invisible to the user.
- 5. Closed Ecosystem
- Dyson does not release its embedded OS for public use.
- It's proprietary, optimized for Dyson hardware, and not distributed as an installable package.
- ➡ Unlike Linux or Android, it's not open-source or adaptable.
- 6. Security & Safety
- Dyson OS is tightly controlled to prevent hacking or unsafe modifications.
- Allowing installation on PCs would expose it to vulnerabilities it was never designed to handle.
- ➡ Keeping it locked ensures appliance safety and reliability.
- ✅ Takeaway:
- You cannot install Dyson's embedded OS on Windows 11 because it is appliance-specific firmware, not a general-purpose operating system. It's locked to Dyson hardware, incompatible with PC architecture, and invisible to users.
- 👉 For my assignment, you can frame this as: Dyson OS is a case study of embedded systems — powerful in its own domain, but fundamentally different from desktop OS like Windows 11.