

Assignment - 2

1. Research and provide three real-world applications where C programming is extensively used, such as in embedded systems, operating systems, or game development.

Embedded Systems

- Example Applications: Automotive control systems, home appliances, medical devices, IoT devices.

Why C is used :

- C allows direct manipulation of hardware through memory addresses and bitwise operations.
- Generates compact and fast code suitable for devices with limited resources (RAM, CPU).
- Most microcontrollers (like ARM, AVR, PIC) have compilers that support C.

Real-World Example:

- Automotive ECUs (Electronic Control Units): C is used to program control units for anti-lock braking systems, airbag systems, and engine control.

Operating Systems

- Example Applications: Windows, UNIX/Linux kernels, MacOS components.

Why C is Used:

- Low-level system access (memory, hardware).
- Portability — OS code written in C can be compiled across different platforms.
- C's performance is critical for system-level programs that require speed and efficiency.

Real-World Example:

- Linux Kernel: Predominantly written in C, it serves as the core of many distributions used in servers, mobile devices (Android), and desktops.

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Game Development

- Example Applications: Game engines, physics engines, rendering engines.

Why C is Used:

- Offers fine control over memory and performance, which is essential for real-time game rendering and physics.
- Many engines provide C/C++ APIs for performance-critical modules.

Real-World Example:

- Doom (1993): A groundbreaking first-person shooter game developed largely in C. Unity and Unreal Engines: While they support scripting in higher-level languages, their cores and performance-critical parts are built in C/C++.

2. Describe the steps to install a C compiler (e.g., GCC) and set up an Integrated Development Environment (IDE) like DevC++, VS Code, or CodeBlocks.

1. Go to the official Dev-C++ website or a trusted source like SourceForge.
2. Locate the installer (usually an .exe file) and download it.
3. Run the Installer:
4. Double-click the downloaded .exe file to begin the installation process.
5. Select Language:
6. Choose your preferred language from the dropdown menu.
7. Agree to the License:
8. Read the license agreement and click "I Agree".
9. Choose Components:
10. Select the components you want to install. The compiler is usually selected by default.
11. Specify Installation Location:
12. Choose the folder where you want to install Dev-C++.
13. Install:
14. Click "Install" to begin the installation process.
15. Launch Dev-C++:
16. Once the installation is complete, you can launch Dev-C++.