RIPHAH INTERNATIONAL UNIVERSITY, ISLAMABAD

Lab#6

Bachelors of Computer Science – 5th Semester

Subject: Operating System

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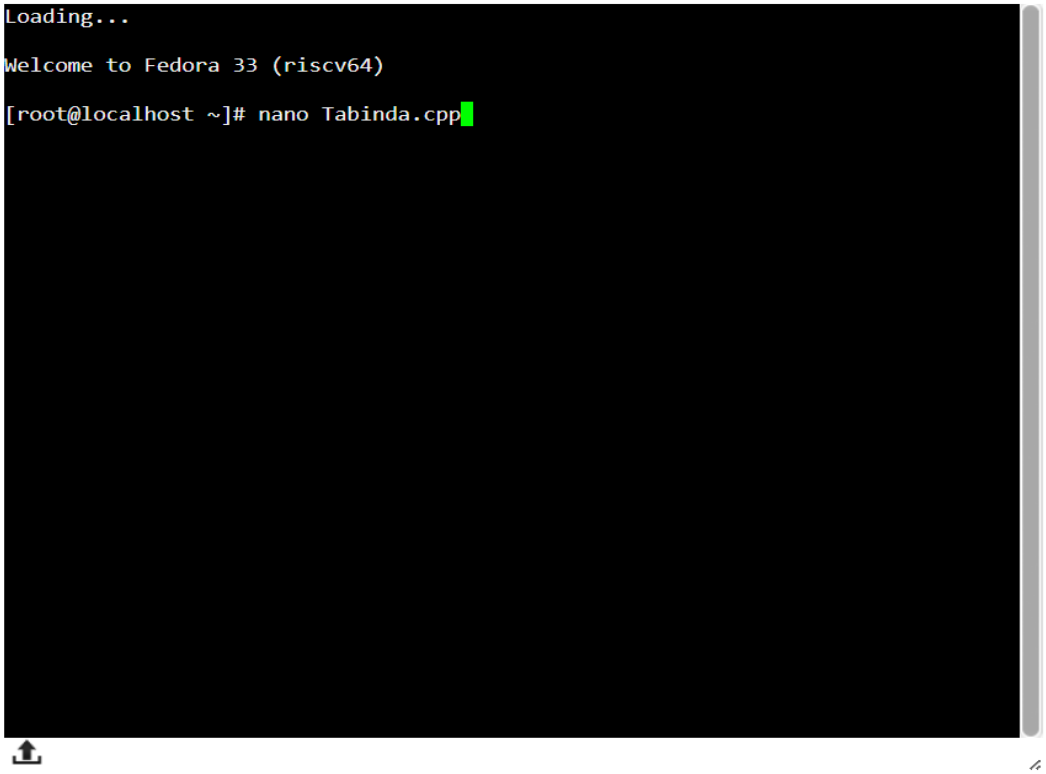
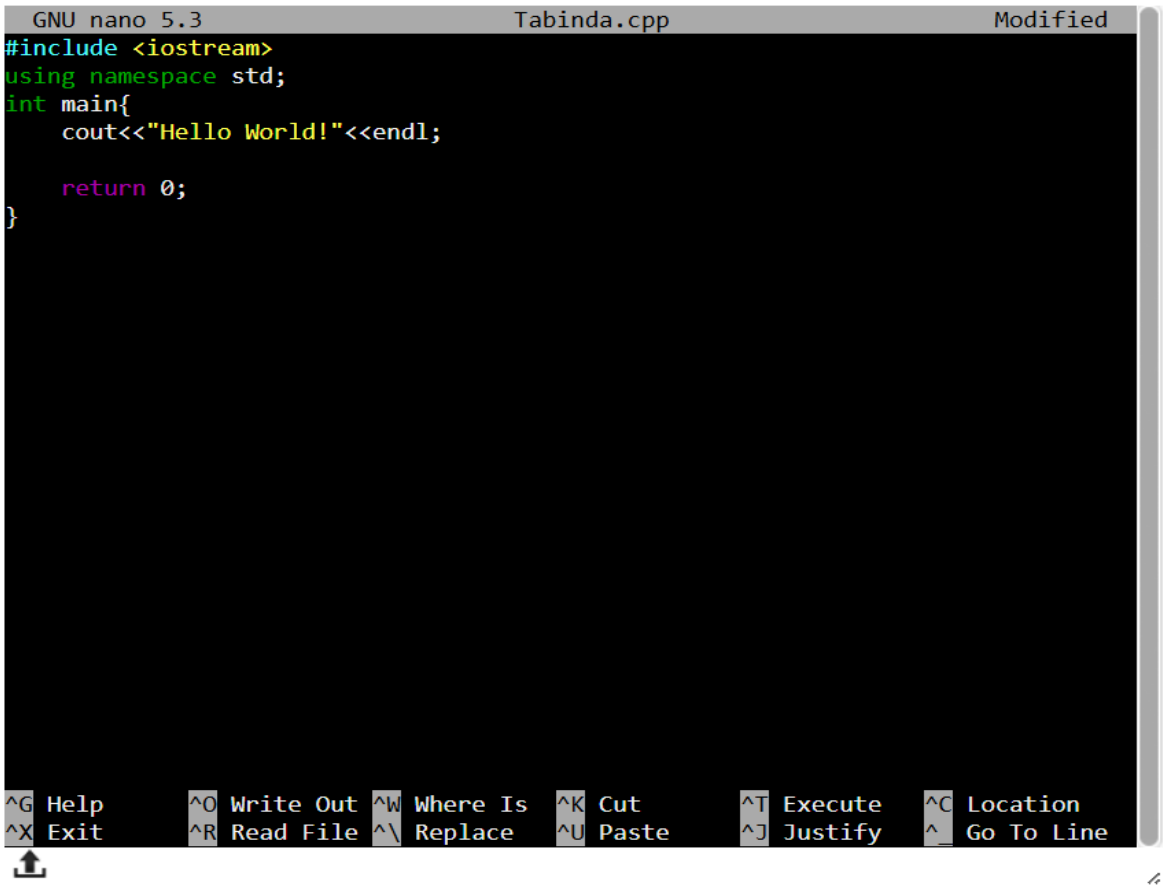
Date of Submission:

Note: Include screenshots, required to illustrate your explanation for all Questions.

Q1: Explain the process of compiling a C program in Linux. What command is used to compile the program?





Q2: What is the purpose of the -o option in the gcc command? Provide an example.

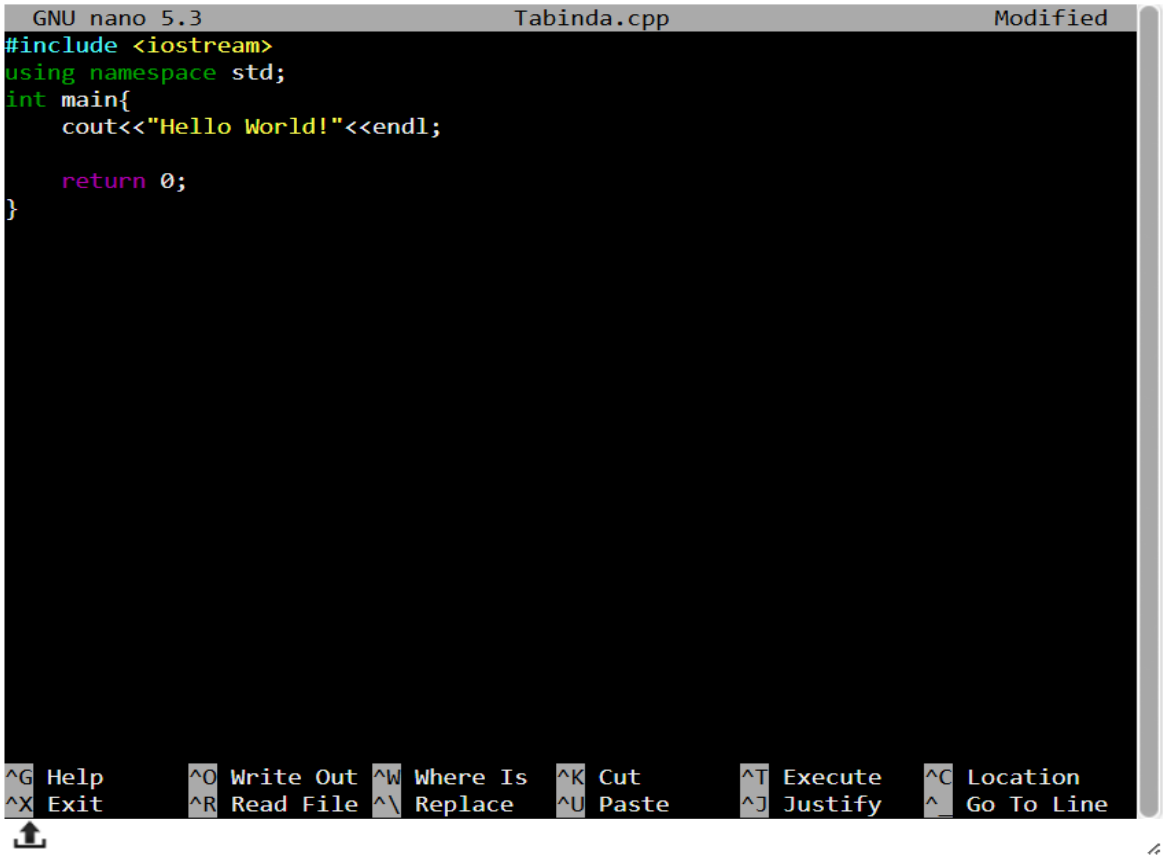
'-o' allows to specify the name of the output file. Without –o, the default name of the output file will be **a.out**

```
gcc program.c -o my_program
```

Q3: What is the difference between g++ and gcc? When would you use each?

- **g++;** for compiling C++ programs, or when working with a mix of C++ and C code. Ensures correct linkage to the C++ libraries.
- **gcc;** for compiling C programs. Can also compile C++ programs when provided with a .cpp file.

Q4: How do you compile and run a C++ program from the terminal? Provide the necessary commands.



To Compile: **g++ Tabinda.cpp -o Tabinda**
To Run: **./program**

Q5: What are templates in C++ in Linux? Write a simple example of a function template.

Templates in C++ allow writing generic functions or classes that can work with any data type. A template provides flexibility by enabling functions or classes to operate on different types without being rewritten for each specific type. This helps with code reuse and reduces duplication.

```
  GNU nano 5.3                    Tabinda.cpp -o Tabinda
#include <iostream>
using namespace std;

template <type T>
T find_max(T a, T b){
     return (a>b) ? a:b;
}

int main(){
    cout<<"Max of 10 & 20: "<<findmax<int>(10, 20)<<endl;
    cout<<"Max of 3.5 & 2,1: "<<findmax<double>(3.5, 2.1)<<endl;
    return 0;
}
```

Q6: Discuss the significance of file extensions in C programming. Why should source files be saved with .c or .cpp extensions?

`.c`: Used for C source files.

`.cpp`: Used for C++ source files.

The file extension indicates the language of the source code, helping the compiler and developer tools understand how to process the file. For instance, `gcc` treats `.c` files as C code, and `g++` treats `.cpp` files as C++ code, linking the appropriate libraries.

Q7: What are the common errors that can occur when compiling C programs, and how can they be resolved?
Common errors include:

Syntax errors: Missing semicolons, incorrect use of braces, etc. – These can be fixed by reviewing and correcting the code.

Undefined references: Occurs when functions or variables are used but not defined or linked – Ensure that all necessary libraries are linked during compilation.

Segmentation faults: Usually caused by invalid memory access.

Q8: Explain how you can manage permissions for an executable file in Linux. What command is used for this purpose?

To manage permissions for an executable file in Linux, the `chmod` command is used.

- **chmod +x File;** use to grant execute permission.
- **chmod 755 File;** read, write and execute permissions to owner

Q9: What is a tarball, and what advantages does it offer for distributing software on Linux? Discuss the limitations of using tarballs for software installation and management.

A tarball is a compressed archive of files that contains multiple files and directories.

Advantages:

- Easy to distribute and transfer multiple files together.
- Supports compression, reducing file size.

Limitations:

- Manual extraction and installation process.
- No automatic dependency resolution.
- Difficult to manage updates and uninstallations.

Q10: Explain the purpose of the RPM package format and how it addresses the shortcomings of tarballs.

RPM (Red Hat Package Manager) is a system used to install, update, and manage software on Linux distributions, providing automatic dependency resolution and version control.

Addresses tarball limitations by offering easy software management through metadata, enabling seamless installation, upgrades, and removals, unlike the manual process needed for tarballs.