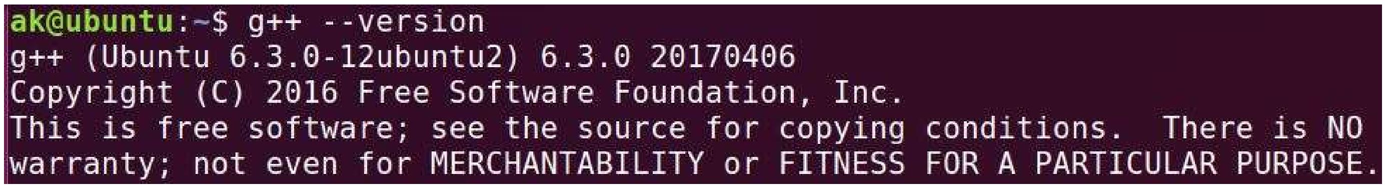
Compiling with g++

g++ command is a GNU c++ compiler invocation command, which is used for preprocessing, compilation, assembly and linking of source code to generate an executable file. The different “options” of g++ command allow us to stop this process at the intermediate stage.

- **Check g++ compiler version information:**

```
g++ --version
```



```
ak@ubuntu:~$ g++ --version
g++ (Ubuntu 6.3.0-12ubuntu2) 6.3.0 20170406
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This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
```

- **Compile a CPP file to generate executable target file:** *g++ file_name* command is used to compile and create an executable file *a.out* (default target name).
  Example: Given a simple program to print “Hello Geek” on standard output with file name *hello.cpp*

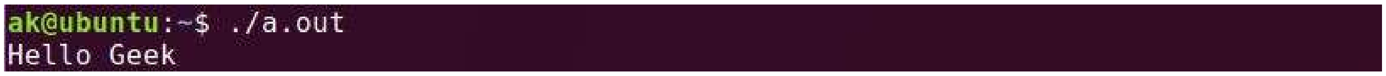
```
// hello.cpp file
#include <iostream>
int main()
{
    std::cout << "Hello Geek\n";
    return 0;
}
```

```
g++ hello.cpp
```

```
ak@ubuntu:~$ g++ hello.cpp
```

This compiles and links *hello.cpp* to produce a default target executable file *a.out* in present working directory. To run this program, type **./a.out** where **./** represents present working directory and **a.out** is the executable target file.

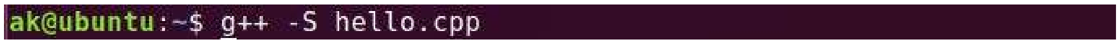
```
./a.out
```



```
ak@ubuntu:~$ ./a.out
Hello Geek
```

- **g++ -S file_name** is used to only compile the **file_name** and **not** assembling or linking. It will generate a **file_name.s** assembly source file.
  Example:

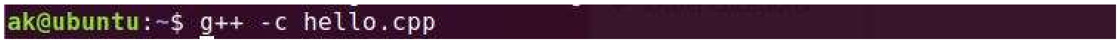
  ```
  g++ -S hello.cpp
  ```

  ```
  ak@ubuntu:~$ g++ -S hello.cpp
  ```

- **g++ -c file_name** is used to only compile and assemble the **file_name** and **not** link the object code to produce executable file. It will generate a **file_name.o** object code file in present working directory.
  Example:

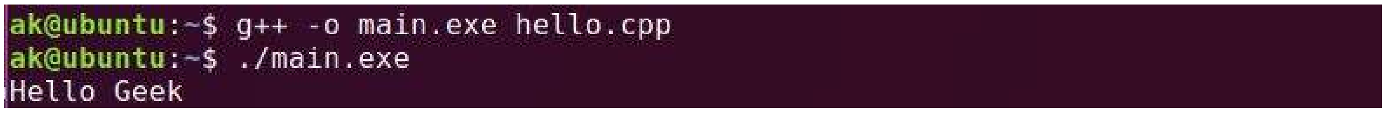
  ```
  g++ -c hello.cpp
  ```

  ```
  ak@ubuntu:~$ g++ -c hello.cpp
  ```

- **g++ -o target_name file_name:** Compiles and links **file_name** and generates executable target file with **target_name** (or a.out by default).
  Example:

  ```
  g++ -o main.exe hello.cpp
  ```

  ```
  ak@ubuntu:~$ g++ -o main.exe hello.cpp
  ak@ubuntu:~$ ./main.exe
  Hello Geek
  ```

- **Compile and link multiple files:** When *-c* flag is used, it invokes the compiler stage which translates source code to object code.When -o flag is used it links object code to create the executable file from **file_name.o** to **a.out(default)**, multiples files may be passed together as arguments.
  Example:

  ```
  // hello.cpp file
  #include "helloWorld.h"
  #include <iostream>
  int main()
  {
      std::cout << "Hello Geek\n";
      helloWorld();
      return 0;
  }
  ```

```
// helloWorld.cpp file
#include <iostream>
void helloWorld()
{
    std::cout << "Hello World\n";
}
```

```
// helloWorld.h file
void helloWorld();
```

```
g++ -c helloWorld.cpp hello.cpp
```

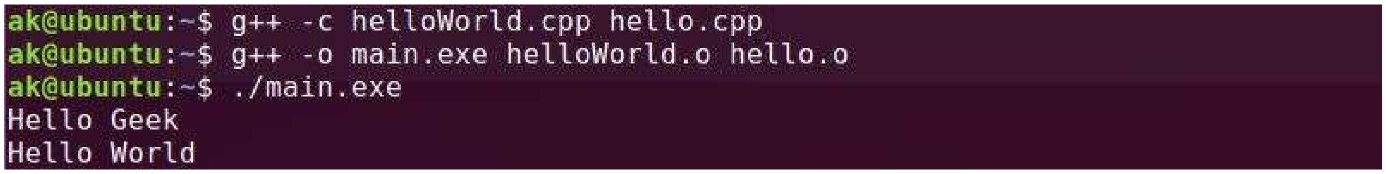
It compiles and creates object code for the files helloWorld.cpp and hello.cpp to helloWorld.o and hello.o respectively.

```
g++ -o main.exe helloWorld.o hello.o
```

It links the object codes helloWorld.o and hello.o to create an executable file main.exe

```
./main.exe
```

It runs the executable file main.exe

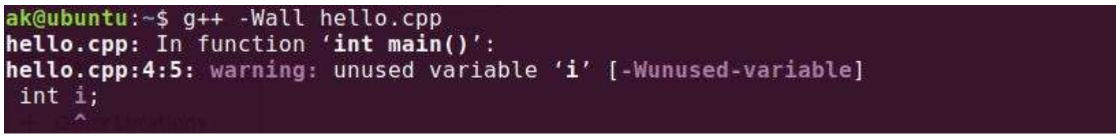


```
ak@ubuntu:~$ g++ -c helloWorld.cpp hello.cpp
ak@ubuntu:~$ g++ -o main.exe helloWorld.o hello.o
ak@ubuntu:~$ ./main.exe
Hello Geek
Hello World
```

- **g++ -Wall file_name:** It prints all warning messages that are generated during compilation of **file_name**.
  Example:

```
// hello.cpp file
#include <iostream>
int main()
{
    int i;
    std::cout << "Hello Geek\n";
    return 0;
}
```

```
g++ -Wall hello.cpp
```



```
ak@ubuntu:~$ g++ -Wall hello.cpp
hello.cpp: In function ‘int main()’:
hello.cpp:4:5: warning: unused variable ‘i’ [-Wunused-variable]
 int i;
     ^
```