



**Ganpat
University**

॥ विद्यया समाजोत्कर्षः ॥

**Institute of
Computer
Technology**

Name: Tushar Panchal

En.No: 21162101014

Sub: OS(Operating Systems)

Branch: CBA

Batch:41

-----PRACTICAL 02-----

❖ **Experiment-2 :**

Debugging various programs written in C/C++ codes with GDB utility.

▪ **Question -1 (unsolved)**

```
#include<iostream.h>
void main()
{
int i = 0;
i = i + 1;
cout << i << " ";
/*comment \*/i = i + 1;
cout << i;
}
```

First is Header File error Correct header file name is:- #include<iostream.h>

Second is namespace error Correction is:- using namespace std;

Third error is unwanted / (backslash) error: Correction is: Remove /

Fourth error is return type error: Correction is : change void to int and insert return 0;

✓ **Correct code after debugging:-**

```
#include <iostream>
using namespace std;
int main()
{
    int i = 0;
    i = i + 1;
    cout << i << " ";
}
```

```

/*comment */ i = i + 1;
cout << i;
return 0;
}

```

Now Compile 1.cpp:

Command is :

`g++ -g -w 1.cpp -o 1`

(-g means compiled binary -w means ignore all warning)

Now load on gdb:

Command is: `gdb 1`

```

tushar@tushar-VirtualBox:~/Documents/2$ g++ -g -w 1.cpp -o 1
tushar@tushar-VirtualBox:~/Documents/2$ ls
1 1.cpp 2 2.cpp
tushar@tushar-VirtualBox:~/Documents/2$ gdb 1
GNU gdb (Ubuntu 12.1-0ubuntu1~22.04) 12.1
Copyright (C) 2022 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from 1...
(gdb) break main
Breakpoint 1 at 0x11b5: file 1.cpp, line 5.
(gdb) layout src
tushar@tushar-VirtualBox:~/Documents/2$ █

```

here , we can see Reading symbols from code1 ... Means file was loaded,

Now we want to create breakpoint for debugging code1

Command is:- `break main`

Then change layout normal to source

Command is:- `layout src`

Then run the program

Command is: `run`

```

1 #include <iostream>
2 using namespace std;
3 int main()
4 {
5     int i = 0;
6     i = i + 1;
7     cout << i << " ";
8     /*comment */ i = i + 1;
9     cout << i;
10    return 0;
11 }
12
13
14
15
16
17
18
19
20

```

Multi-Thread Thread 0x7ffff7a523 In: main L5 PC: 0x5555555551b5
(gdb) run
Starting program: /home/tushar/Documents/2/1
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Breakpoint 1, main () at i.cpp:5
(gdb) █

```

tushar@tushar-VirtualBox:~/Documents/2$ ./1
1 tushar@tushar-VirtualBox:~/Documents/2$

```

Highlighted portion was says you are here now,

If we press **next** or **n** and then Enter then highlighted portion will go next line

We can check here, variable **i** is 1 means code run successfully

Check variable value then

Command:- **print i** or **p i**

▪ **Question -2 (unsolved)**

```

#include<iostream.h>
void main()
{
short i=2500, j=3000;
cour>> "i+j=">> -(i+j);}

```

Here, We got error while compilation,

First Error is header file: **#include <iostream>**

Second error is namespace: **using namespace std;**

Third error is cout syntax error: **rename cour to cout**

Fourth error also syntax error :- **change operator >> to <<**

Fifth error is return type error: **change void to int and insert return 0;**

✓ **Correct code after debugging:-**

```

#include <iostream>
using namespace std;
int main()
{
    short i = 2500, j = 3000;
    cout << "i+j= " << -(i + j);
    return 0;
}

```

```
tushar@tushar-VirtualBox:~/Documents/2$ g++ -g -w 2.cpp -o 2
tushar@tushar-VirtualBox:~/Documents/2$ gdb 2
GNU gdb (Ubuntu 12.1-0ubuntu1~22.04) 12.1
Copyright (C) 2022 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from 2...
(gdb) break main
Breakpoint 1 at 0x11b5: file 2.cpp, line 5.
(gdb) layout src
tushar@tushar-VirtualBox:~/Documents/2$
```

```
2.cpp
4 {
5     short i = 2500, j = 3000;
6     cout << "i+j= " << -(i + j);
7     return 0;
8 }
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

multi-thre Thread 0x7ffff7a523 In: main L5 PC: 0x5555555551b5
(gdb) run
Starting program: /home/tushar/Documents/2/2
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".

Breakpoint 1, main () at 2.cpp:5
(gdb)
```

```
tushar@tushar-VirtualBox:~/Documents/2$ ./2
i+j= -5500tushar@tushar-VirtualBox:~/Documents/2$
```

▪ Question -3 (unsolved)

```
#include <iostream.h>
void main()
{
    int i = 10, j = 5;
    int modResult = 0;
    int divResult = 0;
    modResult = i % j;
    cout << modResult << " ";
    divResult = i / modResult;
    cout << divResult;
}
```

First is Header File error

Correct header file name is:- #include <iostream>

Second is namespace error

Correction is:- `using namespace std;`

Third error is exception handling : Arithmetic expression was found because $10 \% 5$ remainder is 0 then modresult always = 0 then $10/0$ is infinite.

Fourth error is return type error:

Correction is : `change void to int and insert return 0;`

✓ Correct code after debugging:-

```
#include <iostream>
using namespace std;
int main()
{
    int i = 0, j = 5;
    int modResult = 0;
    int divResult = 0;
    modResult = i % j;
    cout << modResult << " " << endl;
    if (modResult == 0)
    {
        cout << "Found Arithmetic Exception." << endl;
        return 0;
    }
    divResult = i / modResult;
    cout << divResult;
    return 0;
}
```

```
1 #include <iostream>
2 using namespace std;
3 int main()
4 {
5     int i = 0, j = 5;
6     int modResult = 0;
7     int divResult = 0;
8     modResult = i % j;
9     cout << modResult << " " << endl;
10    if (modResult == 0)
11    {
12        cout << "Found Arithmetic Exception." << endl;
13        return 0;
14    }
15    divResult = i / modResult;
16    cout << divResult;
17    return 0;
18 }
19
20
21
22
23
24
```

```
multi-threads No process in:
(gdb) run
Starting program: /home/tushar/Documents/2/3
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
0
(gdb) Arithmetic Exception.
[Inferior 1 (process 5895) exited normally]
```

```
tushar@tushar-VirtualBox:~/Documents/2$ ./3
0
Found Arithmetic Exception.
tushar@tushar-VirtualBox:~/Documents/2$
```

▪ Question -4 (unsolved)

```
#include <iostream>#include <iomanip>
using namespace std;
int main()
{
    char *sub[] = { "Maths", "Physics", "Chemestry"};
    int mark[] = {90, 77, 69};
    for (int i = 0; i < 3; i++)
    {
        cout << setw(10) << sub[i] << setw(3) << "=" << setw(4)
        << mark[i] << endl;
    }
    return 0;
}
```

During Compilation i didn't faced any error, Now I just debug the code.

While i debugging the code that time i got one error (Warning) is:- ISO C++ forbids converting a string constant to 'char*' When i try to print *sub[0] that time only we get M because char datatype but we want to access all "Maths" sting that time we want to convert char to string

✓ Correct code after debugging:-

```
#include <iostream>
#include <iomanip>
using namespace std;
int main()
{
    string sub[] = {"Maths", "Physics", "Chemestry"};
    int mark[] = {90, 77, 69};
    for (int i = 0; i < 3; i++)
    {
        cout << setw(10) << sub[i] << setw(3) << "=" << setw(4)
        << mark[i] << endl;
    }
    return 0;
}
```

Now look at the variable section then we can see all memory allocation is perfect after correction code

```
code5.cpp: In function 'int main()':
code5.cpp:6:21: warning: ISO C++ forbids converting a string constant to 'char*' [-Wwrite-strings]
   6 |     char *sub[] = { "Maths", "Physics", "Chemestry"};
     |                      ~~~~~~
code5.cpp:6:30: warning: ISO C++ forbids converting a string constant to 'char*' [-Wwrite-strings]
   6 |     char *sub[] = { "Maths", "Physics", "Chemestry"};
     |                      ~~~~~~
code5.cpp:6:41: warning: ISO C++ forbids converting a string constant to 'char*' [-Wwrite-strings]
   6 |     char *sub[] = { "Maths", "Physics", "Chemestry"};
     |                      ~~~~~~
```

```

tushar@tushar-VirtualBox:~/Documents/2$ gdb 5
GNU gdb (Ubuntu 12.1-0ubuntu1~22.04) 12.1
Copyright (C) 2022 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from 5...
(gdb) break main
Breakpoint 1 at 0x249d: file 5.cpp, line 5.
(gdb) run
Starting program: /home/tushar/Documents/2/5
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".

Breakpoint 1, main () at 5.cpp:5
5
(gdb) disable b
(gdb) run
The program being debugged has been started already.
Start it from the beginning? (y or n) y
Starting program: /home/tushar/Documents/2/5
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
    Maths    = 90
    Physics  = 77
    Chemistry = 69
[Inferior 1 (process 6128) exited normally]

```

```

PS C:\Users\tusha\Documents\SEM 4\OS\UBUNTU SHARED FOLDER\2> cd 4\OS\UBUNTU SHARED FOLDER\2> cd "cPS C:\Users\tusha\Documents\SEM 4\OS\UBUNTU SHARED FOLDER\2> cd
-o tempCodeRunnerFile } ; if ($?) { .\tempCodeRunnerFile }
    Maths    = 90
    Physics  = 77
    Chemistry = 69

```