

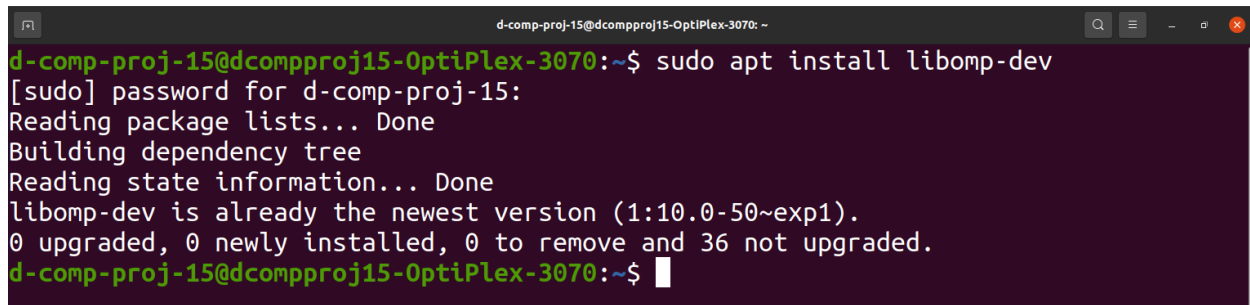
HPC Practical

Steps to perform HPC practical:

Step 1:

Installing open-mp using following command:

Command: `~$ sudo apt install libomp-dev`

A terminal window with a dark purple background. The prompt is 'd-comp-proj-15@dcompproj15-OptiPlex-3070: ~'. The user enters 'sudo apt install libomp-dev'. The terminal shows the password prompt, package list reading, dependency tree building, and state information reading. It then reports that libomp-dev is already the newest version (1:10.0-50~exp1) and that 0 packages were upgraded, 0 newly installed, 0 to be removed, and 36 not upgraded. The prompt returns to '~\$'.

```
d-comp-proj-15@dcompproj15-OptiPlex-3070: ~$ sudo apt install libomp-dev
[sudo] password for d-comp-proj-15:
Reading package lists... Done
Building dependency tree
Reading state information... Done
libomp-dev is already the newest version (1:10.0-50~exp1).
0 upgraded, 0 newly installed, 0 to remove and 36 not upgraded.
d-comp-proj-15@dcompproj15-OptiPlex-3070: ~$
```

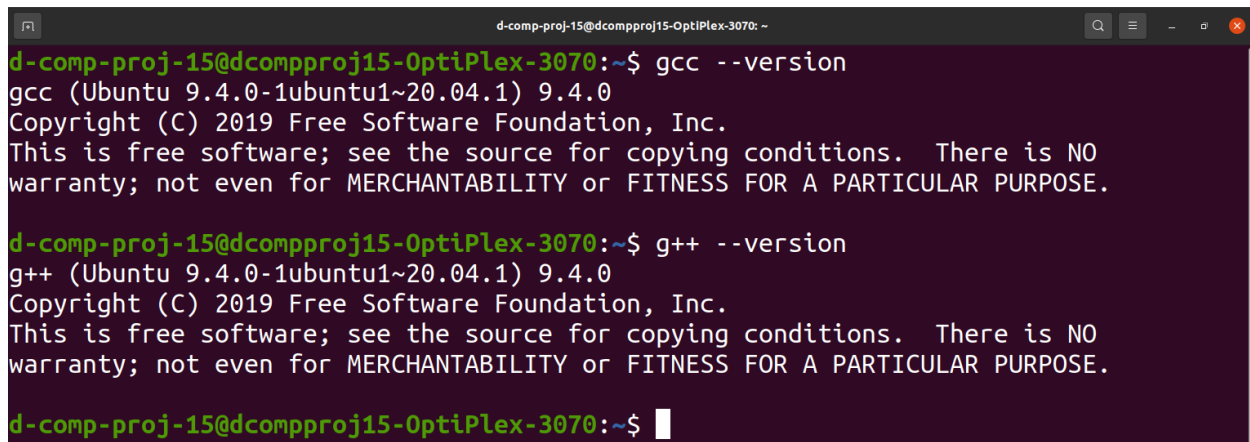
Step 2:

Checking gcc and g++ version to verify gcc and g++ is installed or not

If not installed then install it using these command:

`sudo apt install g++`

`sudo apt install gcc`

A terminal window with a dark purple background. The prompt is 'd-comp-proj-15@dcompproj15-OptiPlex-3070: ~'. The user enters 'gcc --version'. The terminal shows the output: 'gcc (Ubuntu 9.4.0-1ubuntu1~20.04.1) 9.4.0', copyright information, and a disclaimer. Then the user enters 'g++ --version'. The terminal shows the output: 'g++ (Ubuntu 9.4.0-1ubuntu1~20.04.1) 9.4.0', copyright information, and a disclaimer. The prompt returns to '~\$' after each command.

```
d-comp-proj-15@dcompproj15-OptiPlex-3070: ~$ gcc --version
gcc (Ubuntu 9.4.0-1ubuntu1~20.04.1) 9.4.0
Copyright (C) 2019 Free Software Foundation, Inc.
This is free software; see the source for copying conditions. There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

d-comp-proj-15@dcompproj15-OptiPlex-3070: ~$ g++ --version
g++ (Ubuntu 9.4.0-1ubuntu1~20.04.1) 9.4.0
Copyright (C) 2019 Free Software Foundation, Inc.
This is free software; see the source for copying conditions. There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

d-comp-proj-15@dcompproj15-OptiPlex-3070: ~$
```

Step 3:

To open text editor in command line we use following command:

`nano file-name.cpp` to create .cpp program file

`nano file-name.c` to create .c program file

```
d-comp-proj-15@dcompproj15-OptiPlex-3070: ~$ nano bfs-exp1.cpp
```

Step 4:

After creating file we paste code in the editor

Then we press `ctl-x` ⇒ enter `y` for yes ⇒ again enter to save the file

```
GNU nano 4.8 bfs-exp1.cpp Modified
#include<stdio.h>
#include "omp.h"
int q[1000];
int visited[7];
int local_q;

void bfs(int adj_matrix[7][7], int first, int last, int q[], int n_nodes)
{
    if(first==last)
        return;

    //pop first element
    int cur_node = q[first++];

    printf("%d, ", cur_node);
    omp_set_num_threads(3);
    #pragma omp parallel for shared(visited)
    for(int i=0; i<n_nodes; i++)

```

File Name to Write: bfs-exp1.cpp

^G Get Help	M-D DOS Format	M-A Append	M-B Backup File
^C Cancel	M-M Mac Format	M-P Prepend	^T To Files

Step 5:

Now to create file object we use following command:

`g++ -o object_name -fopenmp file_name.cpp` for .cpp file

`gcc -o object_name -fopenmp file_name.cpp` for .c file

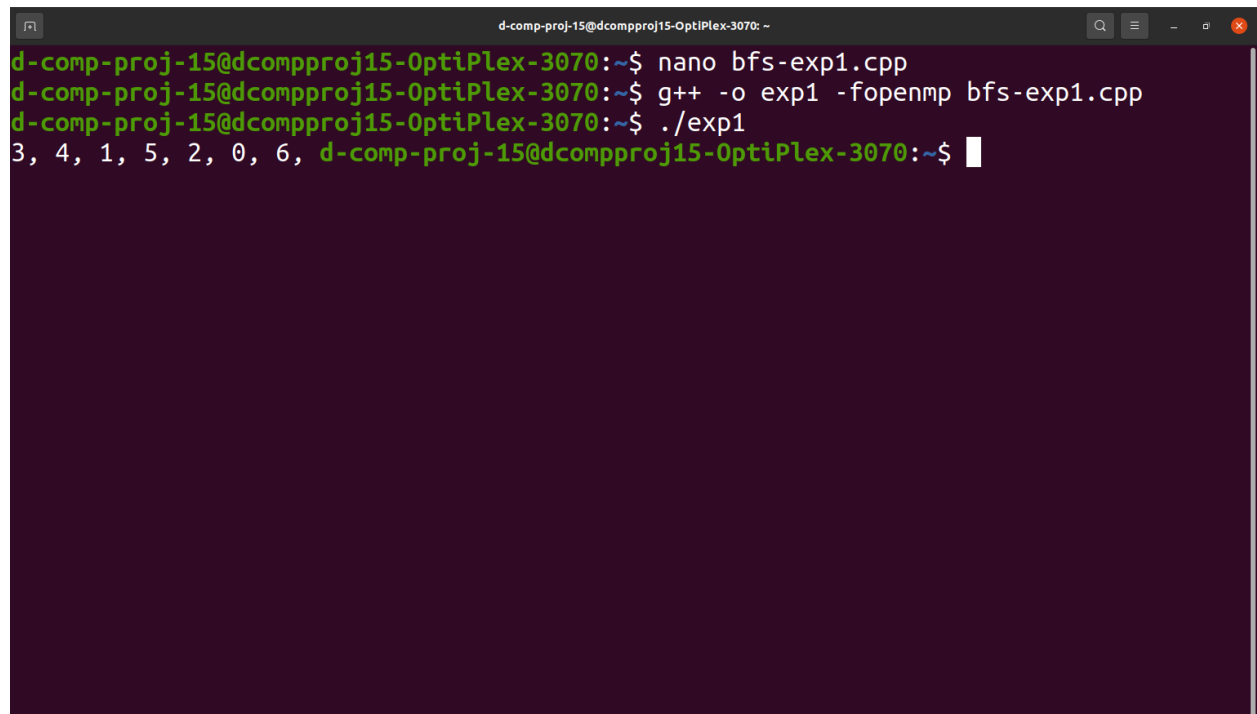
```
d-comp-proj-15@dcompproj15-OptiPlex-3070: ~$ nano bfs-exp1.cpp
d-comp-proj-15@dcompproj15-OptiPlex-3070: ~$ g++ -o exp1 -fopenmp bfs-exp1.cpp
d-comp-proj-15@dcompproj15-OptiPlex-3070: ~$
```

Step 6:

To run the code file we use following command

We run the code by calling object we created in previous step:

Using command: `./object_name`

A terminal window with a dark background and green text. The window title is "d-comp-proj-15@dcompproj15-OptiPlex-3070: ~". The terminal shows the following commands and output:

```
d-comp-proj-15@dcompproj15-OptiPlex-3070:~$ nano bfs-exp1.cpp
d-comp-proj-15@dcompproj15-OptiPlex-3070:~$ g++ -o exp1 -fopenmp bfs-exp1.cpp
d-comp-proj-15@dcompproj15-OptiPlex-3070:~$ ./exp1
3, 4, 1, 5, 2, 0, 6, d-comp-proj-15@dcompproj15-OptiPlex-3070:~$
```