Introduction and Orientation for Programming and Data Structures Laboratory, M. Tech. (CS) 1st year, 2014

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Outline

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General information

- Keep looking for the course web-page: http://www.isical.ac.in/~arijit/courses/autumn2014/pdslab/pdslab.html
- Class timings: Tuesday and Thursday, 2:15 pm to 5:30 pm
- Venue: CSSC Lab, 4th floor, S N Bose Building (Libraray building)
- Instructors:
  - Debapriyo Majumdar (DeM)
  - Ansuman Banerjee (AnB)
  - Arijit Bishnu (ArB)
- Teaching Assistants:
  - Dwaipayan Roy, JRF, CVPR Unit
  - Soumi Chattopadhyay, JRF, ACM Unit
- Marks, Exam, etc.: Laboratory tests (3 in all): 50, Assignments: 50
- Book list: See the course web-page. Carrying a book to the lab is a must.
- **Copying is a serious issue and will be dealt with sternly that involves negative marking.** Acknowledge all help taken.

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- Change the password with the command "`passwd`".
- Create a directory with the command "`mkdir pdslab`"
- Go to the directory with the command "`cd pdslab`"
- Create sub-directories with "`mkdir day1`" and do a "`cd day1`"

Using editor and compiling a program

- Naming convention of files: “cs14xx-dayz-progv.c” for programs that you write in the class and “cs14xx-assignz-progv.c” for programs that you write as assignments. “xx” denotes your roll, “z” denotes the day number and “v” denotes the program number.

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- Keep back ups of your programs.

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- Keep back ups of your programs.
- At the top of each of your program files, even for multi-file programs, add the following.

```
/*-------------------------------
Name:
Roll Number:
Date of Submission:
Deadline date:
Program description:
Acknowledgements:
-------------------------------*/
```

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- Open an editor with `gedit cs14xx-day1-prog1.c &`

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- Let us write and compile a `C` program.

Problem 1

Given four coordinates of a rectangle, find the area of the rectangle.

Let us write a program

```
#include<stdio.h>
int main(void){
 float l_bot_x, l_bot_y, r_bot_x, r_bot_y;
 float l_top_x, l_top_y, r_top_x, r_top_y;
 float height, width;
 printf("\n Give the coord of the left bottom corner::>> ");
 scanf("%f %f",&l_bot_x, &l_bot_y);
 printf("\n Give the coord of the right bottom corner::>> ");
 scanf("%f %f",&r_bot_x, &r_bot_y);
 printf("\n Give the coord of the left top corner::>> ");
 scanf("%f %f",&l_top_x, &l_top_y);
 printf("\n Give the coord of the right top corner::>> ");
 scanf("%f %f",&r_top_x, &r_top_y);
 height = l_top_y - l_bot_y;
 width = r_bot_x - l_bot_x;
 printf("\n The area of the rectangle::>> %f \n", height*width);
 return 0;
}
```

Compiling and executing the program

- Compile the program with
  `gcc -g filename.c -Wall -o filename.o -lm`

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- Compile the program with
  `gcc -g filename.c -Wall -o filename.o -lm`
- Run the program with
  `./filename.o`

Good programming habits

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- Give enough comments.
- Give enough indents.
- Write multifile programs. We will elaborate in later classes.

Write programs for some more problems

Problem 2

Given a rectangle $\mathcal{R}$ and a point p on the 2D plane, find out if p lies outside, inside or on $\mathcal{R}$.

Problem 3

Given a line $\mathcal{L}$ (in the form $y = mx + c$) and a point p on the 2D plane, find out if p lies on, to the left or right of $\mathcal{L}$. With each line, repeat this experiment for 10,000 times.

Problem 4

Given any four points in the 2D plane, ascertain if they form a rectangle.