Indian Institute of Technology Bombay, Mumbai
Department of CSE, Kanwal Rekhi Building
CS101 – Computer Programming
Autumn Semester 2014-2015

Special Makeup Lab 2 – Handout
Monday, 27 October 2014

General Instructions: *Please read the instructions carefully before proceeding further.*

Read the entire lab handout carefully and understand it.
This lab requires you to **download, execute, and submit** one program today before you leave the lab.

The code snippet (splab3.cpp) is uploaded under **'Special Lab'** on course page on http://www.cse.iitb.ac.in/~cs101/labs.html

I. **Download this splab3.cpp** file: Right click on **splab3.cpp** – > click '**Save link as**' – > Go to the desired directory and click '**Save**'.
II. Load this .cpp in Code::Blocks
III. Fill up the necessary blocks of the code
IV. Compile and execute the splab3.cpp file
V. Submit **only a single file** (splab3**.cpp**). The instructions for submitting/uploading a file are given below:
    Goto http://www.cse.iitb.ac.in/~cs101
    1. Click on '**Lab Assignment Submission**' link.
    2. Write your roll number in the text box.
    3. Enter your CC (Computer Centre) LDAP password for authentication purposes
    4. Click the '**Choose File**' button.
    5. Browse through your directory by navigating to the folder in which you have created the project. Select the program i.e. '.cpp' file, from your project directory.
    6. Click the '**Submit**' button.
    7. A new page will open with the message '**Upload Successful. Click here to go back**'
    8. Perform these steps (1 to 7) for all the programs that you have written.
VI. Please note that your IP address is being logged. So, only the lab assignment submissions made from the lab will be evaluated. **Submissions made from the hostel or outside the lab will NOT be considered.**
VII. Since the .cpp file that you submit will be evaluated using an auto-grader, **DO NOT** write any cout statements, else your code **may not pass the auto-grader checks**

Note: Copying code from others amounts to violation of the honor code, and if detected, will lead to severe penalties, which could include award of the FR grade.

Objective: In this lab, you are required to solve practice problems based on functions

Programs to be Submitted Online

The program splab3.cpp has 3 blocks of code that needs to be filled up. The first is Q1, second is Q2, and third is Q3 (Bonus Question and optional).

For Q1, you need to fill in the code within the BEGIN and END statement of the first empty block, which is 'DONT_ERASE_02_01'

For Q2, you need to fill in the code within the BEGIN and END statement of the second empty block, which is 'DONT_ERASE_03_01'

For Q3, you need to fill in the code within the BEGIN and END statement with a 'BONUS' tag of the third block, which is 'DONT_ERASE_04_01'

Take help of your TA if you have difficulty in indentifying the blocks of code.

Question 1
A number '**primeNumber**' is accepted is accepted from the user in the main function. You are requied to write a function '**checkPrime( )**'. You should also write the function call of this function in the main.

The input accepted from the user '**primeNumber**' should be passed to this function '**checkPrime( )**' using call by value technique. The function should check whether the number is prime or not. If it is a prime number, then it should return a boolean value '**true**', else it should return a boolean value '**false**'.

Question 2
Four numbers '**num1**', '**num2**', '**num3**', and '**num4**' are accepted as input from the user in the main function. You are required to write a function '**operation**( )'. You should also write a function call of this function.

The four numbers '**num1**', '**num2**', '**num3**', and '**num4**', accepted from the user, should be passed to this function '**operation**( )' using call by reference technique. The function should perform the following arithmetic operations:
num1 = num1 + num4, num2 = num2 – num4, num3 = num3 * num4
Finally, value 0 should be assigned to num4
These updated values will be printed in the main function. Please note that the function should not return any value.

Question 3 – Bonus Question (Optional)
Note: Use of arrays is not allowed

Ten numbers '**num_a**', '**num_b**', '**num_c**', '**num_d**', '**num_e**', '**num_f**', '**num_g**', '**num_h**', '**num_i**', '**num_j**', are accepted as input from the user in the main function. You are required to write a function '**findMinMax( )**'. You should also write a function call of this function

The ten numbers accepted from the user, should be passed to this function 'findMinMax' using call by reference technique. The function should find the minimum and the maximum number out of the these ten numbers. Now, store the minimum number in 'num_a', and maximum number in 'num_b'. Assign value 0 to all other variables i.e. from 'num_c' to 'num_j'.
The updated values from 'num_a' to 'num_j' are then printed in the main function. Note that the function should not return any value.

Practice Programs (Not to be Submitted)

1) Write a program that takes input of two numbers 'num1' and 'num2' from the user in the main function. Write a function 'swap' that will swap the content of both these variables. The swapped content should be printed in the main function. The function should not return any value.

2) Write a program that accpets two numbers as input. Find the GCD of these two numbers using a function 'findGCD'.

3) Write a program that accepts a number as input from the user. Write a function 'findFactorial' to find the factorial of the number entered by the user and return the factorial to the main function

4) Implement the program given above in '3' using recursion

5) Write a program to accept a number as input from the user and find the sum of 'n' numbers using recursion.

6) We want to find the area of triangle, rectangle, square, rhombus, trapezium, parallelogram and circle. Accept appropriate input from the user, call the appropriate function and print the area in the main function

7) Write a program that implement Tower of Hanoi using recursion
For information on Tower of Hanoi, read the wikipedia article given on the following link
http://en.wikipedia.org/wiki/Tower_of_Hanoi

8) Write a program that prints the following pattern using recursion. The 'cout' statement should be present in the function 'printPattern'. The function should not return any value.

```
CS101.2x
CS101.2
CS101.
CS101
CS10
CS1
CS
C
CS
CS1
CS10
CS101
CS101.
CS101.2
CS101.2x
CS101.2x
```