CS112 Lab: Programming and Data Structure Labs Date: 10th Jan 2017

Assignment-1 Deadline: 11th Jan 2017

Q1. By recent estimates, two-thirds of the people are overweight and about half of those are obese. This causes significant increases in illnesses such as diabetes and heart disease. To determine whether a person is overweight or obese, you can use a measure called the body mass index (BMI). Program your own BMI calculator that reads user's weight in Kilograms and height in meters, then calculate and displays the user's body mass index. Also, the program (file name assign1a.c) should display the following information from the Department of Health and Human Services/National Institutes of Health so the user can evaluate his/her BMI:

BMI VALUES
Underweight: less than 18.5
Normal: between 18.5 and 24.9
Overweight: between 25 and 29.9
Obese: 30 or greater

Use it to calculate your own BMI.

Sample input/output:
Please enter your weight and height (separated by comma): 70, 1.67
Your BMI is: 25.1 and you are overweight.

Q2. The explosive growth of Internet communications and data storage on Internet-connected computers has greatly increased privacy concerns. The field of cryptography is concerned with coding data to make it difficult for unauthorized users to read. In this exercise you'll investigate a simple scheme for encrypting and decrypting data. A company that wants to send data over the Internet has asked you to write a program that will encrypt it so that it may be transmitted more securely. All the data is transmitted as four-digit integers. Your program should read a four-digit integer entered by the user and encrypt it as follows: Replace each digit with the result of adding 7 to the digit and getting the remainder after dividing the new value by 10. Then swap the first digit with the third, and swap the second digit with the fourth. Then print the encrypted integer. Write a separate program (file name assign1b.c) that inputs an encrypted four-digit integer and decrypts it (by reversing the encryption scheme) to form the original number.

Sample input/output:
Enter the four digit number to be encrypted: 1234
The encrypted number: 0189
Enter the four digit number to be decrypted: 0189
The decrypted number: 1234

Q3. Recently Indian Railways introduced the surge pricing system on the Rajdhani, Duronto and Shatabdi trains. Under the new 'flexi fare system', usually followed by airlines, the base fare of tickets will increase with the rising demand. The base fares will increase 10 per cent with every 10 per cent of berths sold, however fares can go up to a maximum of 1.5 times the original base fare. While the first 10 per cent of the seats will be sold at the normal fare, the base fare will increase by 10 per cent with every 10 per cent of berths sold. Once half the tickets are sold, the rest will be sold at 1.5 times higher base fares. Assuming the total number of seats in each train to be 700, write a program (file name assign1c.c) to calculate the ticket price from the available seats and base fare.

Sample input/output:
Enter the base fare: 100.00
Enter the remaining seats: 620
Your ticket price is: 110.00

[Copy-paste of codes is strictly prohibited. All the programs will go through proper plagiarism checking and students with matched codes will be penalized.]

Program Formatting Instruction: Students are advised to write their programs with proper care. A program must have a header block consisting of programmer's name and rollno, along with date of creation. In the header, also include the objective of the program in one line. The program should be properly indented and it is expected that you will use meaningful variable names. For each functional block provide a short and relevant comment.

Submission Process: *Submit your assignment (make sure your assignment can be executed in using gcc compiler) using the link- http://172.16.1.3/~samrat/CS112/submission/*

Login using your rollno (ex: 1601CS01) and password. Once you login, change the password immediately. It is your responsibility to set a strong password that is not guessable by others. Upload the assignments using the specified filenames only.

After the due date (mentioned at top), the uploading of files may be allowed for few more time but it will be treated as late submission. So ensure that you submit the assignment on time. There will be penalty if you are found to take any unfair means during the lab hours and during the assignment submission process. Copying program from any other source and allowing others to copy your program will be penalized equally.

As I or the TAs may not be available to fix the login/networking problem at the last moment so upload the assignment well in advance to avoid any last minute glitches.