IC150P Computation for Engineers Lab

Odd Semester, 2017
Assignment sheet no. 08, Batch – Wednesday Topic: Structures

OBJECTIVES:

- To define structures and use them in functions
- To learn operations on arrays of structures

ASSIGNMENT PROBLEMS:

Task-1: Define a structure to store real and imaginary part of a complex number. Take two complex numbers as input from the user and write separate functions to, (i) add two complex numbers and (ii) multiply two complex numbers. Print the results of these operations in "a+bi" format where a, b is the real and imaginary part of the number respectively.

Task-2: Create a structure to store the data of a user in a bank. The information to be stored is: account holder's name, account number, and balance in the account. Assume that there are maximum 100 users in the bank. First take the input from the user to create this database. Write separate functions for the following operations: (i) Print the account holder's name and account number for all the users who have balance less than Rs. 500 in the account. (ii) If a user requests x amount of money for withdrawal or deposit then following input is given "account number, x, code (W for withdrawal, D for deposit)". Taking this input from the user and check if the transaction is possible or not. If possible, then print the user account information after the transaction. If it is not possible, then print an error message.

Task-3: Received power P_r of a signal at the receiving antenna in a wireless communication system is given by, $P_r = (P_t G_t G_r)/PL$, with $PL = [(4\pi df)/c]^2$, where P_t, G_t, G_r are the transmitted signal power, transmitter antenna gain and receiver antenna gain respectively. PL is the path loss, where, d is the distance between transmitter and receiver antenna, f is the frequency of signal and c is the velocity of light.

Create an array of structures to store transmitted power P_t, frequency f, distance d, path loss PL and received power P_r. Take 5 different values of transmitted power, frequency and distance from the user as input. Write separate functions to (i) compute the value of PL and store it in the structure; (ii) compute the value of received power. Print the value of received power for each input. For your program take $G_t = G_r = 1$.

NOTE:

- Each task carries 2 marks
- You are required to bring pseudo codes (and not full programs) for each of the tasks written in a notebook to the lab session and present them to the Instructors/TAs for evaluation
- The codes need to be created from scratch while you are in lab

REMEMBER:

- To use spaces and indentation to improve the readability of your code
- To add a comment block at the top of your code file stating your name, roll no., assignment and task no.

- To provide comments at appropriate places to aid lucid comprehension of modules