BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI (RAJ.)

Second Semester 2019-20 CS F111 Computer Programming

LABORATORY SESSION #6

(Datatypes)

1. In this question, you will learn more about data types and qualifiers. Type out this program into a file named lab5_sizes.c. Use the vi editor and time saving commands (e.g., dd and p to copy and paste lines) to write this out.

```
#include<stdio.h>
int main()
{
float f;
printf("Sizeof (char) = %lu bytes\n", sizeof(char)); // datatype
printf("Sizeof (short)= %lubytes\n", sizeof(short));
printf("Sizeof (int)= %lu bytes\n", sizeof(int));
printf("Sizeof (long)= %lu bytes\n", sizeof(long));
printf("Sizeof (float)= %lu bytes\n", sizeof(f)); // variable
printf("Sizeof (double)= %lu bytes\n", sizeof(double));
printf("Sizeof (1.55)= %lu bytes\n", sizeof(1.55)); // constant
printf("Sizeof (1.55L)= %lu bytes\n", sizeof(1.55L));
printf("Sizeof (str)= %lu bytes\n", sizeof("Hello")); // string
return 0;
}
```

a. Find out the sizes of data types when prefixed with the keywords signed and unsigned.
b. Now, try various combinations of qualifiers (**short and long**) with the keywords **unsigned** and **signed** keywords. Try which of these the compiler accepts, and which are not. For example, **long unsigned int** is valid, whereas **long unsigned double** is not.

2. Write a C program which takes two character as input and returns the sum of their ASCII as output. For instance, input is A and B, the output should be 131 (sum of the ASCII of A and B).

3. Write a C program that accepts the weight (declared as float) of two items and number of units purchased (declared as int), and calculates the average weight value of the items. A sample input–output instance is given below:
   Provide your input:
   Weight of Item1: 15
   No. of units of item1: 5
   Weight of Item2: 25
   No. of units of item2: 4
   Average weight: 19.444444

4. Explain why the following code prints the largest integral value on your system:

```
unsigned long long val = -1;
printf("The biggest integer value: %llu\n", val);
```

   Note the conversion specifier u (for unsigned integers) preceded by the length modifier ll (ell-ell) used to print the value stored in val. Explore other length modifiers and conversion specifiers by reading the online manual for printf(), by typing the following command at the Linux shell prompt: `man 3 printf`.

5. Write a C program to swap the values of two integer numbers a and b entered by the user, and display the new numbers to the user. Do this with and without using a third variable.

6. A computer manufacturing company has the following monthly compensation policy to their salespersons:

   Minimum base salary : 1500.00
   Bonus for every computer sold : 200.00
   Commission on the total monthly sales : 2 per cent

Since the prices of computers are changing, the sales price of each computer is fixed at the beginning of every month. Write a C program to compute a sales-person's bonus, commission and gross salary