ESS111 : Programming 1 (C Programming) LAB - 4

Due: 16 December, 2020 @ 11:59 pm

Part A (to be submitted)

Problem 1: Write a program to find the range of a list of integers entered through the keyboard. Range is the difference between the biggest and the smallest integers in the list.
Note: Read the size of the list followed by the values (both list size and list values are integers). The list size should be validated such that an error message "`Invalid input`" to be displayed if the value entered is zero or a negative integer. Both positive and negative integers should be allowed for the list values.

Sample Input 1:
-4

Output 1:
Invalid input

Sample Input 2:
4
-9 1 2 3

Output 2:
12

Sample Input 3:
6
2 2 2 2 2 2

Output 3:
0

Problem 2: Write a program to receive an integer and find the reverse of the given integer (ignore the leading zeros in the output).
Note: The entered input should be a non-negative integer. In case of a negative integer received from keyboard, an error message "`Invalid input`" should be displayed.

Sample Input 1:
1260

Output 1:
0621

Sample Input 2:
-121

Output 2:
Invalid input

Problem 3: Write a program to receive an integer and find the octal equivalent of the given integer.
Hint: To obtain octal equivalent of an integer, divide it continuously by 8 till dividend doesn't become zero, then write the remainders obtained in reverse direction.
Note: The entered input should be a non-negative integer. In case of a negative integer received from keyboard, an error message "`Invalid input`" should be displayed.

Sample Input 1:
9

Output 1:
11

Sample Input 2:
-121

Output 2:
Invalid input

Sample Input 3:
8888

Output 3:
21270

Problem 4: Write a program to receive an integer, n and output the count of number of positive integers less than n that are co-prime to n.
Hint: Two integers are said to be co-prime if their greatest common divisor (GCD) is 1. Co-prime count for 1 is 1.
Note: The entered input should be a positive integer. In case of zero or a negative integer received from keyboard, an error message "`Invalid input`" should be displayed.

Sample Input 1:
-9

Output 1:
Invalid input

Sample Input 2:
24

Output 2:
8

Sample Input 3:
13

Output 3:
12

Part B (need not be submitted)

1: Here is an example of a (C) program written by a **careless** programmer.

```c
void main()
{
    int i, number = -5, value = 10;
    if (number >= 0)
        for (i = 0; i < number; i++)
            if (value == 10)
            {
                printf("Value correct");
                return 0;
            }
    else
        printf("Error: number is negative");
    return 0;
}
```

What is the output after its execution?
(1) Value correct (2) Error: number is negative (3) Compilation Error (4) None of the above

2: The piece of (C) code : **for (;;) { }** is an example of :
(1) Compilation Error (2) A do-nothing operation (3) Infinite Loop (4) Dummy function

3: What is the output of the following (C) program? _____

```c
void main()
{
    int i = 10;
    {
```

```
        int i = 20;
        {
            int i = 30;
        }
        printf("%d", i);
    }
}
```

4: What is the output when the following piece of (C) code is executed?

```
int a[5] = {5, 1, 15, 20, 25};
int i, j, k;
i = ++a[1];
j = a[1]++;
k = a[1] * a[2];
printf("%d, %d, %d", i, j, k);
```

(1) 2, 2, 45 (2) 2, 2, 3 (3) 1, 2, 45 (4) 2, 2, 30

5: What is the output when the following piece of (C) code is executed?

```
    int i;
    for (;;) {
        printf("TESTING\n");
        break;
    }
```

```
(1)No output   (2) A large number of "TESTING"
(3)TESTING     (4) Compilation error
```

6: Write a program for a matchstick game being played between the computer and a user. Your program should ensure that the computer always wins. Rules for the game are as follows:

- There are 21 matchsticks.

- The computer asks the player to pick 1, 2, 3, or 4 matchsticks.

- After the person picks, the computer does its picking.

- Whoever is forced to pick up the last matchstick loses the game.