

Section 16

PDS Lab

Assignment - 2

07.08.2018

Instructions:

Create a sub directory named as **Lab2**.

Give the name of the programs as `<p>_1.c`, `<p>_2.c`, .. etc. for the problem 1, 2....., respectively. Here `<p>` implies the part number. For example, Part-A

Store all the programs under this Assignment in the directory **Lab2**.

Zip the entire directory **Lab2** and rename it as `<R>_Lab2.tar.gz`. where `<R>` denotes your Roll No.

You should upload your zipped file to the Moodle course web page latest by 11:55 hrs.

Part-A

1. Edit the following program using edit.

```
#include<stdio.h>

main()
{
    int i = 0;

    printf("Enter a value of i : ");
    scanf("%d", &i);

    printf("\n \n i = %d, i++ = %d, ++i = %d\n", i, ++i, i++);

    return;
}
```

Input: a) i = 5
 b) i = -5
 c) i = 5.5

2. Acceleration due to gravity of a celestial object of mass M and radius R is given by

$$g = G \frac{M}{R^2}$$

Calculate the values of g 's for the earth and moon, given that

Mass of the earth = 5.972×10^{24} kg

Radius of the earth = 6361 km

Mass of the moon = 7.35×10^{22} kg

Radius of the moon = 1737 km

Assume the value of Newton's constant G as $6.67408 \times 10^{-11} \text{ m}^3 \cdot \text{kg}^{-1} \cdot \text{s}^{-2}$

[You should read the values of the above from the keyboard.]

3. Let the variables in the code be defined as: `int a = 5; int b = -3; int c = 0.` Which of the following conditions evaluates to true in the 'C' programming language?
- `(a < b) || (c < b)`
 - `(c < a) && (c < b)`
 - `(a > b) && !c`
 - `!(a + b > c)`

Write a C-program and check your results.

Part-B

4. Find the sum of the following series (You should not use any loop).

$$S = 1 - \frac{1}{2} + \frac{1}{2^2} - \frac{1}{2^3} + \dots (-1)^n \frac{1}{2^n}$$

What will be the value of S for a large value of n, say $n \rightarrow \infty$.

5. Evaluate the expression of T_p ,

$$T_p = T_s \sqrt{\frac{R_s \sqrt{\frac{1-\alpha}{\sigma}}}{2D}}$$

where $\alpha = 0.306$, $T_s = 6.96 \times 10^8$ m, $R_s = 6.96 \times 10^8$ m, $D = 1.496 \times 10^{11}$ m and $\sigma = 1.2$.

Part-C

6. A ball is released from a height of h meters. Each time it bounces on the floor, its velocity becomes halved. Write a program, which reads the value of h and then prints the total distance traversed by the ball when it touches the ground for the n -th time. Assume that the value of acceleration due to gravity, g is 9.8 m/sec^2 .

Hint: Express the distance travelled after n -th collisions.

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Submission instruction

Zip your **Lab2** directory. Upload your zip file into the Moodle server.