

Section 14

PDS Lab

Assignment - 2

16.11.2022

Instructions:

Give sufficient comment against each statement in your program.

You should save each program with the file name as specified against each problem.

There is a partial credit even if your program does not run successfully for all the test cases as mentioned.

No Moddle submission will attract zero credit in the evaluation.

Name the files as {ROLL}_A{#}_Q{#}.c, without the { and }. For ex: 19CS91R05_A2_Q1.c

Consult your TA for any confusion. Penalty if the file names do not stick to this convention.

Consider the C-program as given below.

```
/* This program reads two characters using scanf and print the
characters on the screen. */

#include <stdio.h>

int main()
{
    char c1, c2;    // Two variables to store any character
    scanf("%c%c", &c1, &c2); // Read any two characters
    printf("%c%c", c1, c2);  // Print the characters
    return 0;
}
```

- (a) Use an editor to type the program.
- (b) Compile the program so that the program is successfully compiled and a .out file is created.
- (c) Run the program. To test the program execution, run your program with the following test cases:

Case 1: Type two characters without any blank space between the characters. For example, ab

Case 2: Type two characters with blank space between the characters. For example, 2'3

Case 3: Type a space followed by *. That is '*'

Case 4: Type any 3-digit number, say 123

[Time: 25 Minutes]

[3+4+4× 2=15]

Write a program to do the following.

- (a) Declare three variables as per the following requirements. You should declare all these variables in **global declaration section**.
 - To store a **positive** integer.
 - To store any character which you can type through your computer keyboard.
 - To store a **very large** floating point number.
- (b) Read three values enter through keyboard for each of the variable you have declared.
- (c) Print the values on the screen read by your programs with the following specifications.
 - Print the integer value with “%2d” format.
 - Print the character value with “%d” format.
 - Print the floating point value with floating point format. For example, 6.023×10^{23} (say, it is Avogadro’s Number)

[Time: 30 Minutes]

[6+6+(2+3+3) = 20]

Solution:

```
#include<stdio.h>

int main(){
int a;
char c;
float f;
scanf("%d%c%f",&a,&c,&f);
printf("integer value is %2d",a);
printf("charachter is %d",c);
printf("floating point is %f",f);
}
```

Write a program to find the roots of a quadratic equation: $ax^2 + bx + c = 0$

The roots can be calculated using:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Your program will take the co-efficient a, b and c as inputs (all integers) and print the computed roots.

[Time: 40 Minutes]

[5+(10+10) = 25]

Write a program to evaluate the value of the speed of light (c) and then print the evaluated value. Your program should read the value of μ_0 and ϵ_0 from the keyboard while you run the program.

$$c = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$$

Where, $\mu_0 = 12.566 \times 10^{-7}$, $\epsilon_0 = 8.85 \times 10^{-12}$

[Time: 25 Minutes]

[5+10]

A ball of mass 125 gram is released from a height of Y meters. Each time it bounces on the floor, its velocity becomes halved. Write a program, which reads the value of Y and 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 978 cm/sec^2 .

- (a) Write a C-program to solve the problem.
- (b) Run your program, with the following input:
 - i. Case 1: $Y = 100$ meter, $n=1$
 - ii. Case 2: $Y = 1000$ meters, $n=100$
 - iii. Case 3: $Y = 50$ meters, $n=$ (a very large number)

[Time: 40 Minutes]

[$15+(2+3+5) = 25$]

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