

# MINOR ASSIGNMENT-01

## Practical Programming with C (CSE 3544)

**Publish on:** 19-09-2024

**Course Outcome:** CO<sub>1</sub>

**Program Outcome:** PO<sub>1</sub>

**Submission on:** 26-09-2024

**Learning Level:** L<sub>4</sub>

### Problem Statement:

Working with general form of C program, formatted output function `printf()` and formatted input function `scanf()`

### Assignment Objectives:

Familiarization with the general form of a C program, various ways to use `printf()` to output data items/messages on standard output device and `scanf()` function to input of data items from standard input device.

1. What is the difference between a code and an executable file? Describe the steps used to convert a C code to an executable file. (Write the necessary gcc command to show the working of the intermediate steps)
2. Explain various parts of the C-code with an example.
3. Find the maximum value that can be stored in a float. Explain the reason behind it.
4. What does `scanf()` function returns. Explain the possible return values with examples.
5. Find and explain the output of the following code snippet:

```
#include<stdio.h>
int main() {
    int x=-123;
    printf("%u",x);
    return(0);
}
```

```
#include<stdio.h>
int main(){
    int x=-123;
    printf("%X",x);
    return(0);
}
```

```
#include<stdio.h>
int main(){
    char ch='A';
    print("%d",sizeof(ch));
    print("%d",sizeof('A'));
    return(0);
}
```

```
#include<stdio.h>
int main(){
    int sum;
    sum = 2 + 4 / 2 + 6 * 2;
    printf("%d", sum);
    return 0;
}
```

```
#include<stdio.h>
int main(){
    char ch=97;
    print("%d", sizeof(ch+4));
}
```

```
#include<stdio.h>
int main() {
    int n = printf("Hello\n");
    printf("%d ", n);
    return(0);
}
```

```
#include<stdio.h>
int main() {
    printf("%d==%f==%lf\n", 5, 55.5, 55.5);
    printf("%i==%e==%E\n", 5, 555.5, 123.45);
    printf("%o==%g==%G\n", 9, 555.5, 123.45);
    return 0;
}
```

```
#include<stdio.h>
int main() {
    printf("%d==%i==%o==%x\n", 32, 32, 32, 32);
    printf("%d==%i==%#o==%#x\n", 32, 32, 32, 32);
    printf("%d==%i==%#o==%#X\n", 32, 32, 32, 32);
    printf("%+d==%+i==%#o==%#X\n", 32, 32, 032, 0x45b);
    return 0;
}
```

```
#include<stdio.h>
int main() {
    double x=3000.0, y=0.0035;
    printf("%f %f %f\n", x, y, x*y, x/y);
    printf("%e %e %e\n", x, y, x*y, x/y);
    printf("%E %E %E\n", x, y, x*y, x/y);
    return 0;
}
```

```
#include<stdio.h>
int main()
{
    int i=54321;
    float x=876.543;
    printf(":%3d: :%5d: :%10d: :%12d:\n", i, i, i, I);
    printf(":%3f: :%10f: :%13f: :%f:\n", x, x, x, x);
    return 0;
}
```

```
#include<stdio.h>
int main() {
    int a, b, c;
    printf("Enter in decimal format:");
    scanf("%d", &a);
    printf("Enter in octal format: ");
    scanf("%d", &b);
    printf("Enter in hexadecimal format: ");
    scanf("%d", &c);
    printf("a = %d, b = %d, c = %d", a, b, c);
    printf("Enter in decimal format:");
    scanf("%i", &b);
    printf("Enter in octal format: ");
    scanf("%i", &b);
    printf("Enter in hexadecimal format: ");
    scanf("%i", &c);
    printf("a = %i, b = %i, c = %i\n", a, b, c);
    return 0;
}
```

6. You are tasked with creating a C program to convert a given distance (in meters) to various other units commonly used in science. Your program should prompt the user for a distance in meters and then display a table that converts this distance into Kilometers, Centimeters, Millimeters, Feet, and Inches. The program must satisfy the following requirements.
- (a) Prompt the user to enter a distance in meters (floating-point number).
  - (b) Perform the necessary conversions using the following relationships:
    - 1 meter = 0.001 kilometers
    - 1 meter = 100 centimeters
    - 1 meter = 1000 millimeters
    - 1 meter = 3.28084 feet
    - 1 meter = 39.3701 inches
  - (c) Display the conversions in a neatly aligned table using printf with appropriate format specifiers as follows.

**Enter distance in meters: 12.5**

Unit	Value
Meters	12.50
Kilometers	0.01
Centimeters	1250.00
Millimeters	12500.00
Feet	41.01
Inches	492.13

7. Write a program that predicts the score needed on a final exam to achieve a desired grade in a course. The program should interact with the user as follows:

```
Enter desired grade> B
Enter minimum average required> 79.5
Enter current average in course> 74.6
Enter how much the final counts
as a percentage of the course grade> 25
```

**You need a score of 94.20 on the final to get a B.**

8. Write a program that calculates the acceleration ( $\text{m/s}^2$ ) of a jet fighter launched from an aircraft-carrier catapult, given the jet's takeoff speed in  $\text{km/hr}$  and the distance (meters) over which the catapult accelerates the jet from rest to takeoff. Assume constant acceleration. Also calculate the time (seconds) for the fighter to be accelerated to takeoff speed. When you prompt the user, be sure to indicate the units for each input. For one run, use a takeoff speed of  $278 \text{ km/hr}$  and a distance of  $94 \text{ meters}$ . Relevant formulas ( $v$  = velocity,  $a$  = acceleration,  $t$  = time, and  $s$  = distance)

$$v = at$$

$$s = \frac{1}{2}at^2$$