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MINOR ASSIGNMENT-01

Practical Programming with C (CSE 3544)

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Course Outcome: CO_1 **Program Outcome:** PO_1 **Learning Level:** L_4

Problem Statement:

Experiment with program flow mechanisms.

1. Write the output of the following code snippet.

```
int main(){
  int x=-123;
  printf("%u",x);
  return(0);
}
```

Output

4294967173

```
int main(){
  int x=-123;
  printf("%X",x);
  return 0;
 }
```

Output

FFFFFF85

2. Write the output of the following code snippet.

```
int main(){
 char ch='A';
 printf("%d",sizeof(ch));
 printf("%d",sizeof('A'));
 return(0);
}
```

Output

14

```
int main()
{
 char ch=97;
 printf("%d",
  sizeof(ch+4));
}
```

Output

4

3. Write the output of the following code snippet.

```
int main(){
 int sum;
 sum = 2 + 4 / 2 + 6 * 2;
 printf("%d", sum);
 return 0;
}
```

Output

16

```
int main() {
int n;
n=printf("SOA\n");
printf("%d", n);
return(0);
}
```

Output

SOA
4

4. 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 |
+-----------------+-----------------+
```

Write program here

```
#include <stdio.h>
int main(){
    float meters;
    printf("Enter distance in meters: ");
    scanf("%f", &meters);
    printf("\n+-----------------+-----------------+\n");
    printf("| %-16s | %-16s |\n", "Unit", "Value");
    printf("+-----------------+-----------------+\n");
    printf("| %-16s | %-16.2f |\n", "Meters", meters);
    printf("| %-16s | %-16.2f |\n", "Kilometers", meters*0.001);
    printf("| %-16s | %-16.2f |\n", "Centimeters", meters*100);
    printf("| %-16s | %-16.2f |\n", "Millimeters", meters*1000);
    printf("| %-16s | %-16.2f |\n", "feet", meters*3.28084);
    printf("| %-16s | %-16.2f |\n", "Inches", meters*39.3701);
    printf("+-----------------+-----------------+\n");
    return 0;
}
```

5. 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.
```

Write program here

```
#include <stdio.h>
int main() {
    char grade;
    float min_avg, current_avg, final_weight, needed;
    printf("Enter desired grade> ");
    scanf("%c", &grade);
    printf("Enter minimum average required> ");
    scanf("%f", &min_avg);
    printf("Enter current average in course> ");
    scanf("%f", &current_avg);
    printf("Enter how much the final counts\n as a percentage
            of the course grade> ");
    scanf("%f", &final_weight);
    needed = (min_avg - (100 - final_weight) * current_avg/100)/
             (final_weight)/100);
printf("\nYou need a score of %.2f on the final to get a %c.\n",
    needed, grade);
return 0;
}
```

6. Write a program that calculates the acceleration (m/s^2) of a jet fighter launched from an aircraft-carrier catapult, given the jets takeoff speed in 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 km/hr and a distance of 94 meters. Relevant formulas (v = velocity, a = acceleration, t = time, and s = distance)

$$v = at$$

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

Write program here

```
#include <stdio.h>
#include <math.h>

int main(){
  float v_kmh = 278, s=94;
  float v_ms , a , t;
  v_ms = v_kmh * 1000/3600;
   a = (v_ms * v_ms)/(2*s);
   t = v_ms /a;
  printf("Takeoff speed: %.2f km/hr (%.2f m/s)\n", v_kmh,v_ms);
  printf("Distance: %.2f m\n",s);
  printf("Acceleration: %.2f m/s^2\n",a);
  printf("Time to takeoff: %.2f s\n",t);
  return 0;
}
```