Practice Programs

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Program 1: Write a C program to print the following text message each time it is run.
'To C, or not to C: that is the question.'

pun.c :

```c
#include <stdio.h>

int main(void) {
    printf("To C, or not to C: that is the question.\n");
    return 0;
}
```

Program 2: Write a C program to demonstrate simple arithmetic.

simpleArithematic.c

```c
#include<stdio.h>

int main(){
    int a, b, c;

    printf("Please enter two numbers : ");
    scanf("%d %d", &a, &b);//ok

    c = a + b;//addition
    printf("The Sum is %d\n", c);

    c = a - b;//substraction
    printf("The Difference is %d\n", c);

    c = a * b;//multiplication
    printf("The Product is %d\n", c);

    c = a / b;
    printf("The Division is %d\n", c);
    return 0;
}
```

Program 3: Write a C program to calculate Simple Interest.

simpleInterestCalculator.c

```c
#include<stdio.h>

int main(){
    int numberOfYears;
    float principleAmount, rateOfInterest, simpleInterest;

    printf("Enter Principle Amount\n", principleAmount);
    scanf("%f", &principleAmount);
    printf("Enter number of year\n", numberOfYears);
    scanf("%d", &numberOfYears);
    printf("Enter Rate of Interest\n", rateOfInterest);
    scanf("%f", &rateOfInterest);

    simpleInterest = (principleAmount * numberOfYears * rateOfInterest) / 100;
    printf("Simple interest is %f\n", simpleInterest);

    return 0;
}

```

Program 4: Write a C program to calculate Simple EMI.

simpleEMICalculator.c

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

int main() {
    float principle, rate, time, emi;

    printf("Enter principle amount: ");
    scanf("%f", &principal);

    printf("\nEnter rate of interest: ");
    scanf("%f", &rate);

    printf("\nEnter time in years: ");
    scanf("%f", &time);

    rate = rate / (12 * 100); /*one month interest*/
    time = time * 12; /*one month period*/

    emi= ( principal * rate * pow(1 + rate,time)) / (pow(1 + rate,time) - 1);

    printf("Monthly EMI is= %f\n", emi);

    return 0;
}

```

Program 5: Write a C program to calculate Student Percentage of 5 subjects

studentPercentageCalculator.c

```c
#include<stdio.h>

int main() {
    int a,b,c,d,e;
    float total, average, percentage;

    printf("Enter marks of 5 subjects : \n");
    scanf("%d %d %d %d %d", &a, &b, &c, &d, &e);

    total  = a + b + c + d + e;
    average = total / 5;
    percentage  = (total / 500) * 100;

    printf("Total marks = %f\n", total);
    printf("Average marks = %f\n", average );
    printf("Net percentage = %f\n", percentage);
    return 0;
}
```

Program 6: Write a program taking user input of basic salary and calculating gross salary that includes basic salary, 50% DA and 40% HRA.

grossSalaryCalculator.c

```c
#include<stdio.h>

void main() {
    float basic,hra,da,gross;

    printf("Enter the Basic Salary : $");
    scanf("%f", &basic);

    hra = 40 * basic / 100;
    da = 50 * basic / 100;
    gross = basic + hra + da;

    printf("Gross Salary is $%f", gross);
}
```

Program 7: Write a program to calculate area of Square, Triangle & Rectangle using user inputs of shape data.

areaOfShapes.c

```c
#include <stdio.h>

void main() {
    float area;
    float side; //For sqaure
    float base, height; //For triangle
    float length, breadth; //For rectangle

    //Area of sqaure
    printf("Enter the side of square in cms: ");
    scanf("%f",&side);
    area = side * side;
    printf("Area of square with sides %.2f cms is %f\n", side, area);

    //Area of Triangle
    printf("Enter the base of triangle in cms : ");
    scanf("%f",&base);
    printf("Enter the height of triangle in cms : ");
    scanf("%f",&height);
    area = 0.5 * base * height;
    printf("Area is of triangle with base %.2fcms and height %.2fcms is %fcms\n", base, height, area);

    //Area of Rectangle
    printf("Enter the length of rectanlge in cms : ");
    scanf("%f", &length);
    printf("Enter the breadth of rectangle in cms : ");
    scanf("%f", &breadth);
    area = length * breadth;
    printf("The area of rectangle with lenght %.2fcms and breadth %.2fcms is %fcms\n", length, breadth, area);
}
```

Program 8: Write a program to calculate Area & Circumference of a Circle, take user inputs.

areaAndCircumference.c

```c
#include<stdio.h>

int main() {
    float radius, area, circumference;

    printf("Enter the radius of Circle in cms : ");
    scanf("%f", &radius);

    area = 3.14 * radius * radius; //Area of circle
    circumference = 2 * 3.14 * radius; //Circumference of circle

    printf("Area of circle is %f\n", area);
    printf("Circumference of circle is %f\n", circumference);
    return 0;
}
```

Program 9: Write a program to calculate Dimensional weight of a box to help shipping companies charge accordingly.

dimensionalWeight.c

```c
/*The problem is about calculating the dimensional weight of a box,
 which shipping companies use to charge based on space taken rather
 than actual weight. The formula divides the box's volume by 166,
 but since integer division in C truncates decimals (rounds down),
 we adjust by adding 165 before dividing to properly round up.*/

#include <stdio.h>

int main(void) {
    int height, length, width, volume, weight;

    printf("Enter height of the box: ");
    scanf("%d", &height);
    printf("Enter length of the box: ");
    scanf("%d", &length);
    printf("Enter width of the box: ");
    scanf("%d", &width);

    volume = height * length * width;
    weight = (volume + 165) / 166;

    printf("Volume of box is %d (cubic inches)\n", volume);
    printf("Dimensional weight of the box is % d pounds\n", weight);
}
```

Program 10: Write a program to convert the user given temperature in Celsius(*C) into Fahrenheit(*F).

celsiusToFahrenheit.c

```c
/* Converts a Celsius temperature to Fahrenheit */

#include<stdio.h>

#define FREEZING_PT 32.0f
#define SCALE_FACTOR (9.0f / 5.0f)

int main() {
    float celsius,fahrenheit;

    printf("Enter the Temperature in Celcius : ");
    scanf("%f",&celsius);

    fahrenheit = SCALE_FACTOR * celsius + FREEZING_PT;

    printf("Temperature in Fahernheit is %.1f F", fahrenheit);

    return 0;
}
```

Program 11: Write a program to convert the user given temperature in Fahrenheit(*F) into Celsius(*C).

fahrenheitToCelsius.c

```c
/* Converts a Fahrenheit temperature to Celsius */

#include <stdio.h>

#define FREEZING_PT 32.0f
#define SCALE_FACTOR (5.0f / 9.0f)

int main() {
  float fahrenheit, celsius;

  printf("Enter Fahrenheit temperature: ");
  scanf("%f", &fahrenheit);

  celsius = (fahrenheit - FREEZING_PT) * SCALE_FACTOR;

  printf("Celsius equivalent: %.1f\n", celsius);

  return 0;
}
```

Program 12: Write a program to convert the user given temperature in Celsius(*C) to Kelvin(*K).

celsiusToKelvin.c

```c
/* Converts a Celsius temperature to Kelvin */

#include <stdio.h>

#define SCALE_FACTOR 273.15

int main()
{
    float celsius, kelvin;

    printf("Enter the Temperature in Celcius : ");
    scanf("%f", &celsius);

    kelvin = celsius + SCALE_FACTOR;

    printf("Temperature in Kelvin is %.2f k\n", kelvin);
    return 0;
}
```

Program 13: Write a program to convert the user given temperature in Kelvin(*K) into Celsius(*C).

kelvinToCelsius.c

```c
/* Converts a Kelvin temperature to Celsius */

#include <stdio.h>

#define SCALE_FACTOR 273.15

int main()
{
    float celsius, kelvin;

    printf("Enter the Temperature in Kelvin : ");
    scanf("%f", &kelvin);

    celsius = kelvin - SCALE_FACTOR;

    printf("Temperature in Celsius is %.2f C\n", celsius);
    return 0;
}
```

Program 14: Write a program to accept the distance between two cities in kilometres from the user. Calculate and display this distance in meters, feet, centimetres and inches

distanceConverter.c

```c
#include<stdio.h>
#include<conio.h>

void main() {
    float km, mt, inch, ft, cm;

    printf("Enter the distance between two cities in kilometers : ");
    scanf("%f", &km);

    mt = km * 1000;
    ft = mt * 3.33;
    cm = mt * 100;
    inch = ft * 12;

    printf("The distance in meters is = %.2f mts.\n", mt);
    printf("The distance in feets is = %.2f ft.\n", ft);
    printf("The distance in centimeters is = %.2f cms.\n", cm);
    printf("The distance in inchs is = %.2f inches.\n", inch);
}
```

Program 15: Write a program to demonstrate bitwise operator on two integers.

bitwiseCalculation.c

```c
#include <stdio.h>

int main()
{
    int a = 14, b = 7;

    printf("Bitwise NOT of a (~a): %d\n", ~a);
    printf("Bitwise NOT of b (~b): %d\n\n", ~b);

    printf("a & b = %d\n", a & b);

    printf("a | b = %d\n", a | b);

    printf("a ^ b = %d\n\n", a ^ b);

    printf("a << 1 = %d\n", a << 1);
    printf("b << 1 = %d\n\n", b << 1);

    printf("a >> 1 = %d\n", a >> 1);
    printf("b >> 1 = %d\n", b >> 1);

    return 0;
}
```

Program 16: Write a program to demonstrate increment operator on an integer.

incrementOperator.c

```c
// Increment operator

#include<stdio.h>
int main()
{
    int a= 5;
    int b, c, d;

    printf("Value of a = %d\n", a);

    b = ++a;
    c = a++;
    d = ++a;

    printf("Value of b using ++a = %d\n", b);
    printf("Value of c using a++ = %d\n", c);
    printf("Value of d using ++a = %d\n", d);

    return 0;
}
```

Program 17: Write a program to demonstrate decrement operator on an integer.

decrementOperator.c

```c
// Decrement operator

#include<stdio.h>

int main() {
    int a= 8;
    int b, c, d;

    printf("Value of a = %d\n", a);

    b = --a;
    c = a--;
    d = --a;

    printf("Value of b using --a = %d\n", b);
    printf("Value of c using a-- = %d\n", c);
    printf("Value of d using --a = %d\n", d);

    return 0;
}
```

Program 18: Write a program to calculate size of variables.

calculateSizeOfOperator.c

```c
/* sizeof() operator in c is used to calculate the size of a variable
used inside the program and return the size in integer in the form
of memory bytes*/

#include<stdio.h>

int main()
{
    int a = 6;
    float b = 8.765f;
    long long int c = 15050603LL;
    double d = 78945.321654;
    char ch = 'X';    // Capital X

    printf("Size of a : %d Bytes\n" ,sizeof(a));
    printf("Size of b : %d Bytes\n" ,sizeof(b));
    printf("Size of c : %d Bytes\n" ,sizeof(c));
    printf("Size of d : %d Bytes\n" ,sizeof(d));
    printf("Size of X : %d Bytes\n",sizeof(ch));

    return 0;
}
```

Program 19: Write a program to find ASCII value of the character user inputs.

findASCIIValue.c

```c
/* Program to find ASCII value */

#include <stdio.h>

int main() {
    char c;

    printf("Enter a character: ");

    // Reads character input from the user
    scanf("%c", &c);

    // %d displays the integer value of a character
    // %c displays the actual character
    printf("ASCII value of %c = %d", c, c);
    return 0;
}
```

Program 20: Write a program to output numbers in certain formats using printf() function.

formattedOutput.c

```c
/* Prints int and float values in various formats */

#include <stdio.h>

int main(void)
{
  int i;
  float x;

  i = 40;
  x = 839.21f;

  printf("|%d|%5d|%-5d|%5.3d|\n", i, i, i, i);
  printf("|%10.3f|%10.3e|%-10g|\n", x, x, x);

  return 0;
}
```

Program 21: Write a program to add two fractions taken from the user and show the result.

addTwoFraction;

```c
/* Adds two fractions */

#include <stdio.h>

int main(void) {
  int num1, denom1, num2, denom2, result_num, result_denom;

  printf("Enter first fraction: ");
  scanf("%d/%d", &num1, &denom1);

  printf("Enter second fraction: ");
  scanf("%d/%d", &num2, &denom2);

  result_num = num1 * denom2 + num2 * denom1;
  result_denom = denom1 * denom2;

  printf("The sum is %d/%d\n", result_num, result_denom);

  return 0;
}
```

Program 22: Write a program to add two fractions taken from the user and show the result.

upcCodeCheck.c

```c
/* Computes a Universal Product Code check digit */

#include <stdio.h>

int main(void) {
  int d, i1, i2, i3, i4, i5, j1, j2, j3, j4, j5;
  int first_sum, second_sum, total;

  printf("Enter the first (single) digit: ");
  scanf("%1d", &d);
  printf("Enter first group of five digits: ");
  scanf("%1d%1d%1d%1d%1d", &i1, &i2, &i3, &i4, &i5);
  printf("Enter second group of five digits: ");
  scanf("%1d%1d%1d%1d%1d", &j1, &j2, &j3, &j4, &j5);

  first_sum = d + i2 + i4 + j1 + j3 + j5;
  second_sum = i1 + i3 + i5 + j2 + j4;
  total = 3 * first_sum + second_sum;

  printf("Check digit: %d\n", 9 - ((total - 1) % 10));

  return 0;
}
```