Code Like Pro!

Basic Input Output Solutions

1. Risabh's basic salary is given as input through the keyboard. His dearness allowance is 25% of basic salary, house rent allowance is 15% of basic salary and provident fund is 7.5% of basic salary. Write a program to calculate his gross salary.

```c
#include <stdio.h>

int main() {
    float basic_sal, gross_sal;
    printf("Enter basic salary: ");
    scanf("%f",&basic_sal);

    /* Gross Salary = Dearness Allowance + House Rent
       Allowance - Provident Fund */
    gross_sal = basic_sal + (25+15-7.5)/100*basic_sal;

    printf("Gross salary: %f", gross_sal);
    return 0;
}
```

2. Write a program which takes a Fahrenheit temperature as input and prints the equivalent Celsius temperature.

```c
#include <stdio.h>

int main() {
    float fah;
    printf("Enter temperature in Fahrenheit: ");
    scanf("%f",&fah);

    /* T(°C) = (T(°F) - 32) × 5/9 */
    printf("%.2f", (fah-32)*5/9);
    return 0;
}
```

3. Write a program to receive Cartesian coordinates (x,y) of a point and convert them to polar coordinates (r,φ).

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

int main() {
    float x, y, r, phi;
    printf("Enter cartesian coordinates as x y: ");
    scanf("%f %f", &x, &y);
```

```
    r = sqrt(x*x + y*y);

    /* atan2 returns the principal arc tangent of y/x,
       in the interval [-pi,+pi] radians */
    phi = atan2(y, x);

    printf("r = %.2f units, phi = %.2f radians", r, phi);
    return 0;
}
```

4. Write a program which takes two integers as input, which denote meters and centimeters, and converts this distance into feet and inches.

```
#include <stdio.h>

int main() {
    int m, cm, feet;
    float inch;
    printf("Enter length as m cm: ");
    scanf("%d %d", &m, &cm);

    /* 1 Inch = 2.54 Centimeters and 12 Inches = 1 Foot */
    feet = ((m*100+cm)*100/254)/12;
    inch = (m*100+cm)/2.54 - 12*feet;

    printf("Feet: %d, Inches: %.2f", feet, inch);
    return 0;
}
```

5. Write a program which takes the principal amount, rate of interest and number of years and calculates the amount after the entered number of years if the principal amount is compounded quarterly at the entered rate of interest for the entered time.

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

int main() {
    float principal, rate, amount;
    int years;
    printf("Enter the principal amount: ");
    scanf("%f", &principal);
    printf("Enter the rate of interest: ");
    scanf("%f", &rate);
    printf("Enter the number of years: ");
    scanf("%f", &years);

    amount = principal * pow((1+rate/100), 4*t);
    printf("Amount = %f\n", amount);

    return 0;
}
```

6. Write a program to swap or interchange the contents of two integer variables, using a third variable.

```c
#include <stdio.h>

int main() {
    int x, y, temp;
    printf("Enter the two numbers: ");
    scanf("%d %d", &x, &y);

    temp = x;
    x = y;
    y = temp;

    printf("Swapped numbers: %d %d", x, y);
    return 0;
}
```

7. Write a program to swap or interchange the contents of two integer variables, without using a third variable.

```c
#include <stdio.h>

int main() {
    int x, y;
    printf("Enter the two numbers: ");
    scanf("%d %d", &x, &y);

    x = x + y;
    y = x - y;
    x = x - y;

    printf("Swapped numbers: %d %d", x, y);
    return 0;
}
```

8. Write a program to calculate the sum of the series: 1+2+3+4+...+n, where n is entered by the user.

```c
#include <stdio.h>

int main() {
    int n, sum;
    printf("Enter the value of n: ");
    scanf("%d", &n);

    sum = n*(n+1)/2;

    printf("Sum of series is %d", sum);
    return 0;
}
```

9. Write a program to calculate the sum of the series: $1+2+4+8+...+2^n$, where n is entered by the user.

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

int main() {
    int n, sum;
    printf("Enter the value of n: ");
    scanf("%d", &n);

    sum = (1 - (int)pow(2, n))/(1 - n);

    printf("Sum of series is %d", sum);
    return 0;
}
```

10. If the lengths of 3 sides of a triangle are provided as input, write a program to find the three angles of the triangle.

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

int main() {
    float a, b, c, A, B, C;
    // a,b, c are the sides and A, B, C are the angles

    printf("Enter the three sides of triangle: ");
    scanf("%f %f %f",&a,&b,&c);

    // acos(x) returns principal arc cosine of x in radians
    /* We can use the cosine formula to get the angles, and
       convert it to degrees */
    A = acos((b*b+c*c-a*a)/(2*b*c))*180/3.14;
    B = acos((a*a+c*c-b*b)/(2*a*c))*180/3.14;
    C = acos((b*b-c*c+a*a)/(2*b*a))*180/3.14;

    printf("The three angles are %f %f and %f\n", A, B, C);
    return 0;
}
```