

Questions

1. Write a C program to create an array that stores marks obtained by a student in 4 subjects (each out of 100). Calculate and display the percentage score of the student.
2. Write a C program to define a structure containing the following members:
 - Name
 - Roll Number
 - Marks Obtained

Take user input for all members and display the entered details.
3. Write a C program to define a union named NumericValue.
Include different data types as members of the union.
Assign values to each member and display them.
Observe and explain the behavior of unions.
4. Write a C program to input two numbers from the user and perform all arithmetic operations:
 - Addition
 - Subtraction
 - Multiplication
 - Division
 - Modulus

Display all results.
5. Write a C program to calculate Simple Interest.
$$\text{Simple Interest} = (\text{Principal} \times \text{Rate} \times \text{Time}) / 100$$
6. Write a C program to input two numbers and display the greater number.
7. Write a C program to swap the values of two variables:
 - a) Using a third variable
 - b) Without using a third variable

Solutions

1. Percentage of 4 Subjects

Question Explanation:

This program stores marks of 4 subjects in an array, calculates total marks, and computes the percentage using $(\text{Total} / 400) \times 100$.

Program Code:

```
#include <stdio.h>

int main() {
    int marks[4];
    int sum = 0;
    float percentage;

    printf("Enter marks for 4 subjects:\n");

    for(int i = 0; i < 4; i++) {
        scanf("%d", &marks[i]);
        sum += marks[i];
    }

    percentage = (sum / 400.0) * 100;
    printf("Percentage = %.2f%%\n", percentage);

    return 0;
}
```

Code Explanation:

An array stores marks. A loop takes input and adds them to sum. Float division ensures correct percentage calculation.

2. Structure – Student Details

Question Explanation:

This program defines a structure to store name, roll number, and marks of a student. It takes input and displays the details.

Program Code:

```
#include <stdio.h>

struct Student {
    char name[50];
    int rollno;
    float marks;
};

int main() {
    struct Student s;

    printf("Enter Name: ");
    scanf(" %[^\n]", s.name);

    printf("Enter Roll Number: ");
    scanf("%d", &s.rollno);

    printf("Enter Marks: ");
    scanf("%f", &s.marks);

    printf("\nStudent Details:\n");
    printf("Name: %s\n", s.name);
    printf("Roll No: %d\n", s.rollno);
    printf("Marks: %.2f\n", s.marks);

    return 0;
}
```

Code Explanation:

A structure groups different data types together. The structure variable stores user input and prints values.

3. Union – NumericValue

Question Explanation:

This program demonstrates union behavior where all members share the same memory location.

Program Code:

```
#include <stdio.h>

union NumericValue {
    int i;
    float f;
    char c;
};

int main() {
    union NumericValue num;

    num.i = 10;
    printf("Integer: %d\n", num.i);

    num.f = 5.5;
    printf("Float: %.2f\n", num.f);

    num.c = 'A';
    printf("Character: %c\n", num.c);

    return 0;
}
```

Code Explanation:

Union members share memory. Assigning a new value overwrites the previous stored value.

4. Arithmetic Operations

Question Explanation:

This program performs addition, subtraction, multiplication, division, and modulus operations on two numbers.

Program Code:

```
#include <stdio.h>

int main() {
    int a, b;

    printf("Enter two numbers: ");
    scanf("%d %d", &a, &b);

    printf("Addition = %d\n", a + b);
    printf("Subtraction = %d\n", a - b);
    printf("Multiplication = %d\n", a * b);

    if(b != 0) {
        printf("Division = %.2f\n", (float)a / b);
        printf("Modulus = %d\n", a % b);
    } else {
        printf("Division not possible (division by zero).\n");
    }

    return 0;
}
```

Code Explanation:

The program performs arithmetic operations and checks for division by zero using an if condition.

5. Simple Interest

Question Explanation:

This program calculates simple interest using $SI = (P \times R \times T) / 100$.

Program Code:

```
#include <stdio.h>

int main() {
    float P, R, T, SI;

    printf("Enter Principal, Rate, Time: ");
    scanf("%f %f %f", &P, &R, &T);

    SI = (P * R * T) / 100;

    printf("Simple Interest = %.2f\n", SI);

    return 0;
}
```

Code Explanation:

It takes principal, rate, and time as input, applies the formula, and prints the result.

6. Greater of Two Numbers

Question Explanation:

This program compares two numbers and prints the greater one.

Program Code:

```
#include <stdio.h>

int main() {
    int a, b;

    printf("Enter two numbers: ");
    scanf("%d %d", &a, &b);

    if(a > b)
        printf("%d is greater\n", a);
    else if(b > a)
        printf("%d is greater\n", b);
    else
        printf("Both numbers are equal\n");

    return 0;
}
```

Code Explanation:

Using if-else statements, the program compares two numbers and prints the greater value.

7(a). Swap Using Third Variable

Question Explanation:

This program swaps two variables using a temporary variable.

Program Code:

```
#include <stdio.h>

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

    printf("Enter two numbers: ");
    scanf("%d %d", &a, &b);

    temp = a;
    a = b;
    b = temp;

    printf("After swapping: a = %d, b = %d\n", a, b);

    return 0;
}
```

Code Explanation:

A temporary variable stores one value while the swap is performed.

7(b). Swap Without Third Variable

Question Explanation:

This program swaps two variables using arithmetic operations.

Program Code:

```
#include <stdio.h>

int main() {
    int a, b;

    printf("Enter two numbers: ");
    scanf("%d %d", &a, &b);

    a = a + b;
    b = a - b;
    a = a - b;

    printf("After swapping: a = %d, b = %d\n", a, b);

    return 0;
}
```

Code Explanation:

Values are swapped using addition and subtraction without using an extra variable.