1) Write a program to accept different types of data from user and display data and its size in C .

Ans

```
#include <stdio.h>

int main() {
   int i;
   float f;
   double d;
   char c;

   printf("Enter an integer: ");
   scanf("%d", &i);
   printf("Entered integer: %d, Size: %lu bytes\n", i, sizeof(i));

   printf("Enter a float: ");
   scanf("%f", &f);
   printf("Entered float: %f, Size: %lu bytes\n", f, sizeof(f));

   printf("Enter a double: ");
   scanf("%lf", &d);
   printf("Entered double: %lf, Size: %lu bytes\n", d, sizeof(d));

   printf("Enter a char: ");
   scanf(" %c", &c);
   printf("Entered char: %c, Size: %lu byte\n", c, sizeof(c));

   return 0;
}
```

Q.2 Write a program to find sum of 2 integers in C using function.

Ans

```
#include <stdio.h>

int add(int x, int y) {
   return x + y;
}

int main() {
   int a, b;
   printf("Enter two integers: ");
   scanf("%d %d", &a, &b);
   printf("Sum: %d\n", add(a, b));
   return 0;
}
```

Q.3 Write a Function to find sum of 2 integers using one global variable .

Ans

```
#include <stdio.h>

int sum;  // Global variable

void add(int x, int y) {
   sum = x + y;
}

int main() {
   int a, b;
   printf("Enter two integers: ");
   scanf("%d %d", &a, &b);
   add(a, b);
```

```
    printf("Sum: %d\n", sum);
    return 0;
}
```

Q4) Write a program to take two inputs from the user and Check whether the sum of 2 integers lies between 10 and 50

Ans

```
#include <stdio.h>

int main() {
    int a, b, sum;
    printf("Enter two integers: ");
    scanf("%d %d", &a, &b);
    sum = a + b;
    if (sum > 10 && sum < 50) {
        printf("Sum %d is between 10 and 50\n", sum);
    } else {
        printf("Sum %d is not between 10 and 50\n", sum);
    }
    return 0;
}
```

Q.5 **Program to print range of a number using if-else ladder statement in C:**

Ans

```
#include <stdio.h>

int main() {
    int num;
    printf("Enter a number: ");
    scanf("%d", &num);

    if (num < 0)
```

```
        printf("Negative\n");
    else if (num >= 0 && num <= 10)
        printf("Range 0 to 10\n");
    else if (num > 10 && num <= 20)
        printf("Range 11 to 20\n");
    else if (num > 20 && num <= 30)
        printf("Range 21 to 30\n");
    else
        printf("Greater than 30\n");

    return 0;
}
```

Q.6 Program to print range of a number using Switch statement in C:

Ans

```
#include <stdio.h>

int main() {
    int num;
    printf("Enter a number (0-30): ");
    scanf("%d", &num);

    switch (num / 10) {
        case 0:
            printf("Range 0 to 10\n");
            break;
        case 1:
            printf("Range 10 to 20\n");
            break;
        case 2:
            printf("Range 20 to 30\n");
```

```
            break;
        default:
            printf("Greater than 30\n");
            break;
    }
    return 0;
}
```

Q.7 **Program to demonstrate increment and decrement operator:**

Ans

```
#include <stdio.h>

int main() {
    int num = 10;
    printf("Original number: %d\n", num);

    num++;
    printf("After increment: %d\n", num);

    num--;
    printf("After decrement: %d\n", num);
    return 0;
}
```

Q.8

Q.9 **Program to perform arithmetic operations based on user input:**

Ans

```
#include <stdio.h>

int main() {
```

```
    int num1, num2;
    char op;
    printf("Enter two integers and an operator (+, -, *, /): ");
    scanf("%d %d %c", &num1, &num2, &op);

    switch(op) {
        case '+':
            printf("Result: %d\n", num1 + num2);
            break;
        case '-':
            printf("Result: %d\n", num1 - num2);
            break;
        case '*':
            printf("Result: %d\n", num1 * num2);
            break;
        case '/':
            if (num2 != 0)
                printf("Result: %.2f\n", (float)num1 / num2);
            else
                printf("Division by zero error!\n");
            break;
        default:
            printf("Invalid operator\n");
    }

    return 0;
}
```

Q.10 **Program to perform relational operations**:

Ans

```
#include <stdio.h>

int main() {
    int num1, num2;
    printf("Enter two integers: ");
    scanf("%d %d", &num1, &num2);

    printf("Results of relational operations:\n");
    printf("%d == %d is %d\n", num1, num2, num1 == num2);
    printf("%d != %d is %d\n", num1, num2, num1 != num2);
    printf("%d > %d is %d\n", num1, num2, num1 > num2);
    printf("%d < %d is %d\n", num1, num2, num1 < num2);
    printf("%d >= %d is %d\n", num1, num2, num1 >= num2);
    printf("%d <= %d is %d\n", num1, num2, num1 <= num2);

    return 0;
}
```

Q.11 **Program to perform logical operations**:

Ans

```
#include <stdio.h>

int main() {
    int num1, num2;
    printf("Enter two integers (non-zero for true, zero for false): ");
    scanf("%d %d", &num1, &num2);

    printf("Logical AND (&&): %d\n", (num1 != 0) && (num2 != 0));
    printf("Logical OR (||): %d\n", (num1 != 0) || (num2 != 0));
    printf("Logical NOT (!) on first number: %d\n", !(num1 != 0));
```

```
    return 0;
}
```

Q.12 **Program to print summation of first 20 numbers using a while loop:**

Ans

```
#include <stdio.h>

int main() {
    int sum = 0, i = 1;
    while (i <= 20) {
        sum += i;
        i++;
    }
    printf("Summation of first 20 numbers is: %d\n", sum);
    return 0;
}
```

Q.13 **Program to print summation of first 30 numbers using a do-while loop:**

Ans

```
#include <stdio.h>

int main() {
    int sum = 0, i = 1;
    do {
        sum += i;
        i++;
    } while (i <= 30);
    printf("Summation of first 30 numbers is: %d\n", sum);
    return 0;
}
```

Q.14 **Program to find the sum of elements in an array:**

Ans

```
#include <stdio.h>

int main() {
    int n, i, sum = 0;
    printf("Enter number of elements in the array: ");
    scanf("%d", &n);
    int arr[n];

    printf("Enter elements of the array: ");
    for (i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
        sum += arr[i];
    }

    printf("Sum of array elements: %d\n", sum);
    return 0;
}
```

Q.15 **Program to find the sum of two matrices (2D arrays):**

Ans

```
#include <stdio.h>

int main() {
    int r, c, i, j;
    printf("Enter number of rows and columns of matrices: ");
    scanf("%d %d", &r, &c);
    int mat1[r][c], mat2[r][c], sum[r][c];
```

```
    printf("Enter elements for first matrix:\n");
    for(i = 0; i < r; i++) {
        for(j = 0; j < c; j++) {
            scanf("%d", &mat1[i][j]);
        }
    }

    printf("Enter elements for second matrix:\n");
    for(i = 0; i < r; i++) {
        for(j = 0; j < c; j++) {
            scanf("%d", &mat2[i][j]);
        }
    }

    printf("Sum of matrices:\n");
    for(i = 0; i < r; i++) {
        for(j = 0; j < c; j++) {
            sum[i][j] = mat1[i][j] + mat2[i][j];
            printf("%d ", sum[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

Q.16 **Program to accept a string from the user and compare two strings**:

Ans

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

```
int main() {
    char str1[100], str2[100];
    printf("Enter first string: ");
    fgets(str1, sizeof(str1), stdin);
    str1[strcspn(str1, "\n")] = 0;  // Remove newline character if present

    printf("Enter second string: ");
    fgets(str2, sizeof(str2), stdin);
    str2[strcspn(str2, "\n")] = 0;  // Remove newline character if present

    printf("Length of first string: %ld\n", strlen(str1));
    printf("Length of second string: %ld\n", strlen(str2));

    if (strcmp(str1, str2) == 0)
        printf("The strings are equal.\n");
    else
        printf("The strings are not equal.\n");

    return 0;
}
```

Q.17 **Program to accept two strings from the user, join them and convert to uppercase**:

Ans

```
#include <stdio.h>
#include <string.h>
#include <ctype.h>

int main() {
    char str1[100], str2[100], joined[200];
```

```
    printf("Enter first string: ");
    fgets(str1, sizeof(str1), stdin);
    printf("Enter second string: ");
    fgets(str2, sizeof(str2), stdin);

    // Remove newline character if present
    str1[strcspn(str1, "\n")] = 0;
    str2[strcspn(str2, "\n")] = 0;

    // Concatenate strings
    strcpy(joined, str1);
    strcat(joined, str2);

    // Convert to uppercase
    for (int i = 0; joined[i] != '\0'; i++) {
        joined[i] = toupper(joined[i]);
    }

    printf("Joined string in uppercase: %s\n", joined);

    return 0;
}
```

Q.18 **Program to accept a string from the user, find its length and copy it to another string**:

Ans

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

int main() {
```

```
    char str[100], copy[100];
    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);
    str[strcspn(str, "\n")] = 0;  // Remove newline character if present

    strcpy(copy, str);
    printf("Original string: '%s'\n", str);
    printf("Copied string: '%s'\n", copy);
    printf("Length of the string: %ld\n", strlen(str));

    return 0;
}
```

Q.19 **Program to store and display student information using a structure**:

Ans

```
#include <stdio.h>

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

int main() {
    struct Student student;
    printf("Enter student's name: ");
    fgets(student.name, sizeof(student.name), stdin);
    printf("Enter student's age: ");
    scanf("%d", &student.age);
    printf("Enter student's marks: ");
    scanf("%f", &student.marks);
```

```
    printf("\nStudent Information:\n");
    printf("Name: %s", student.name);
    printf("Age: %d\n", student.age);
    printf("Marks: %.2f\n", student.marks);

    return 0;
}
```

Q.20 **Program to find the cube of a number using call by value**:

Ans

```
#include <stdio.h>

int cube(int n) {
    return n * n * n;
}

int main() {
    int number;
    printf("Enter a number: ");
    scanf("%d", &number);
    printf("Cube of %d is %d\n", number, cube(number));
    return 0;
}
```

Q.21 **Program to swap two numbers using call by reference**:

Ans

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

```
void swap(int *a, int *b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}

int main() {
    int num1, num2;
    printf("Enter two numbers: ");
    scanf("%d %d", &num1, &num2);

    printf("Before swap: num1 = %d, num2 = %d\n", num1, num2);
    swap(&num1, &num2);
    printf("After swap: num1 = %d, num2 = %d\n", num1, num2);

    return 0;
}
```