PROBLEM1:Variable Initialization

Question:

Write a program that declares an integer variable, initializes it with a value of 42, and prints the value to the console.

Programme

```
#include <stdio.h>

int main(){
   int a=42;
   printf("Value of a=%d",a);
   return 0;
}
```

Output

Value of a=42

PROBLEM2: Swapping Variables

Question:

Create a program that swaps the values of two integer variables without using a temporary variable. Demonstrate this by printing the values before and after the swap.

Programme

```
#include <stdio.h>

int main(){
   int a=10;
   int b=20;
   printf("The values before swapping\n");
   printf("a=%d\nb=%d\n",a,b);
   a=a+b; //30
   b=a-b; //10
   a=a-b; //20

   printf("The values after swapping");
```

```
    printf("The values before swapping\n");
    printf("a=%d\nb=%d\n",a,b);
}
```

Output

The values before swapping

a=10

b=20

The values after swappingThe values before swapping

a=20

b=10

PROBLEM3: User Input and Output

Question:

Write a program that prompts the user to enter their name and age, stores these values in appropriate variables, and then prints a greeting message that includes both the name and age.

Programme

```
#include <stdio.h>
int main(){
    int age;
    char name[40];
    printf("Enter your name\n");
    scanf("%s",name);
    printf("Enter your age\n");
    scanf("%d",&age);
    printf("Hello %s you are %d years old!!",name,age);
}
```

Output

Enter your name

Amritha

Enter your age

22

Hello Amritha you are 22 years old!!

PROBLEM4: Data Type Conversion

Question:

Write a program that declares an integer variable, assigns it a value of 10, and then converts it to a float variable. Print both the integer and float values to show the conversion.

Programme

```
#include <stdio.h>

int main(){
   int a=10;
   float a_float;
   printf("Integer Value of a=%d\n",a);
   a_float=(float)a;
   printf("Float Value of a=%f",a_float);
}
```

Output

Integer Value of a=10

Float Value of a=10.000000

PROBLEM5: Constants vs. Variables

Question:

Using #define, create a constant for the value of Pi (3.14). Write a program that calculates the area of a circle given its radius (stored in a variable) and prints the result using the constant for Pi.

Programme

```
#include <stdio.h>

#define pi 3.14

int main(){
   float r,area;
```

```
    printf("Enter the radius of the circle\n");
    scanf("%f",&r);
    area=(pi*r*r);
    printf("The area of the circle with radius %.2f is\n %.2f",r,area);
    return 0;
}
```

Output

```
Enter the radius of the circle
5
The area of the circle with radius 5.00 is
 78.50
```

PROBLEM6: Scope of Variables

Question:

Write a program that demonstrates the concept of variable scope by declaring a global variable and modifying it within a function. Print the value of the global variable before and after modification.

Programme

```
#include <stdio.h>
int global_variable=50;

void modifying_function(){
    global_variable=100;
    printf("value of global_variable in inside the function=%d\n",global_variable);
}

int main(){
    printf("value of global_variable before modification= %d\n",global_variable);
    modifying_function();
    printf("value of global_variable after calling modifying_function= %d",global_variable);
    return 0;
}
```

Output

value of global_variable before modification= 50

value of global_variable in inside the function=100

value of global_variable after calling modifying_function= 100

PROBLEM7: Using Augmented Assignment Operators

Question:

Write a program that uses augmented assignment operators (+=, -=, *=, /=) to perform calculations on an integer variable initialized to 100. Print the value after each operation.

Programme

```
#include <stdio.h>
int main(){
   int value=100;
   value += 10;
   printf("After += 10: %d\n", value);
   value -= 20;
   printf("After -= 20: %d\n", value);
   value *= 3;
   printf("After *= 3: %d\n", value);
    value /= 2;
   printf("After /= 2: %d\n", value);

   return 0;
}
```

Output

After += 10: 110

After -= 20: 90

After *= 3: 270

After /= 2: 135

PROBLEM8: Array of Variables

Question:

Create an array of integers with five elements. Initialize it with values of your choice, then write a program to calculate and print the sum of all elements in the array.

Programme

```
#include <stdio.h>

int main(){
   int arr[5]={1,2,3,4,5};
   int sum=0,i;
   printf("The array is:\n[");
   for(i=0;i<5;i++){
      printf("%d,",arr[i]);
      sum=sum+arr[i];
   }
   printf("]\nThe sum of array elements=%d",sum);
}
```

Output

The array is:

[1,2,3,4,5,]

The sum of array elements=15

Problem9: User Authentication Program

Objective:

Create a C program that prompts the user for a username and password, then checks if the entered credentials match predefined values. Use logical operators to determine if the authentication is successful.

Requirements:

- Define two constants for the correct username and password.
- Prompt the user to enter their username and password.
- Use logical operators (&&, ||, !) to check if:
- If both are correct, display a success message.
- Implement additional checks:
- If the username is empty, display a message indicating that the username cannot be empty.
- If the password is empty, display a message indicating that the password cannot be empty.

- The username matches the predefined username AND the password matches the predefined password.
- If either the username or password is incorrect, display an appropriate error message.

Programme

```
#include <stdio.h>
#include <string.h>
#define USERNAME "Amritha"
#define PASSWORD "Amritha123"

int main() {
   char username[50];
   char password[50];



   printf("Enter username: ");
   scanf("%s",username);

   printf("Enter password: ");
   scanf("%s",password);
   if (strlen(username) == 0) {
      printf("Error: Username cannot be empty.\n");
   } else if (strlen(password) == 0) {
      printf("Error: Password cannot be empty.\n");
   } else {

      if (strcmp(username,USERNAME) == 0 && strcmp(password,PASSWORD) == 0) {
         printf("Authentication successful!\n");
      } else {
         if (strcmp(username, USERNAME) != 0) {
            printf("Error: Incorrect username.\n");
         }
```

```
        if (strcmp(password, PASSWORD) != 0) {
            printf("Error: Incorrect password.\n");
        }
    }
  }

  return 0;
}
```

Output

```
Enter username: Amritha
Enter password: Amritha123
Authentication successful!

Enter username: amrithha
Enter password: Amritha123
Error: Incorrect username.

Enter username: Amritha
Enter password: amritha123
Error: Incorrect password.

Enter username: amritha
Enter password: amrit123
Error: Incorrect username.
Error: Incorrect password.
```