1. 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.

Program

```
#include <stdio.h>

int main()

{

   int a;

   a=42;

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

   return 0;

}
```

Output

The value of a=42

2. 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.

Program

```
#include <stdio.h>

int main()

{

   int a=10;

   int b=20;

   printf("The value of a and b before swapping=%d %d \n",a,b);

   a=a+b;

   b=a-b;

   a=a-b;

   printf("The value of a and b after swapping=%d %d \n",a,b);

   return 0;

}
```

Output

The value of a and b before swapping=20 10

The value of a and b after swapping= 10 20

3. 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.

Program

```
#include <stdio.h>

int main()

{

   int age;

   char name[50];

   printf("Enter your age:");

   scanf("%d",&age);

   printf("Enter your name:");

   scanf("%s",name);

   printf("Happy %dth birthday! %s",age,name);

   return 0;

}
```

Output

Enter your age:22

Enter your name:varsha

Happy 22th birthday! varsha

4. 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.

Program

```
#include <stdio.h>

int main()

{

   int a;

   a=10;
```

```
    printf("The a=%d\n",a);
    float b=(float)a;
    printf("The a=%f",b);
    return 0;
}
```

Output

The a=10

The a=10.000000

5. 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.

Program

```
#include <stdio.h>
#define PI 3.14
int main()
{
    float r,area;
    printf("Enter the radius:");
    scanf("%f",&r);
    area=PI*r*r;
    printf("The area is %f",area);
    return 0;
}
```

Output

Enter the radius:3

The area is 28.260000

6. 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.

Program

```
#include <stdio.h>

int global = 10;

void modify() {
    printf("Value of global_variable inside function before modification: %d\n", global);
    global = 20;
    printf("Value of global_variable inside function after modification: %d\n", global);
}

int main() {
    printf("Value of global_variable before calling function: %d\n", global);

    modify();

    printf("Value of global_variable after calling function: %d\n", global);

    return 0;
}
```

Output

```
Value of global_variable before calling function: 10
Value of global_variable inside function before modification: 10
Value of global_variable inside function after modification: 20
Value of global_variable after calling function: 20
```

8. Using Augmented Assignment Operators Que... by Abhinav Karan (Unverified)Abhinav Karan (Unverified)10:45 am

8. 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.

Program

```
#include <stdio.h>

int main() {
   int a = 100;
   printf("Initial value: %d\n",a);

   // Use augmented assignment operators
   a += 10;
   printf("After += 10: %d\n", a);

   a -= 20;
   printf("After -= 20: %d\n", a);

   a *= 3;
   printf("After *= 3: %d\n", a);

   a /= 5;
   printf("After /= 5: %d\n", a);

   return 0;
}
```

Output

Initial value: 100

After += 10: 110

After -= 20: 90

After *= 3: 270

After /= 5: 54

9. 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.

Program

```
#include <stdio.h>

int main() {
   int a[5] = {1,2,3,4,5};
   int sum=0;
   for(int i=0;i<5;i++)
   {
      sum=sum+a[i];
   }
   printf("The sum is %d",sum);
   return 0;
}
```

Output

The sum is 15

Assignment: 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

1. Define two constants for the correct username and password.
2. Prompt the user to enter their username and password.
3. Use logical operators (&&, ||, !) to check if:
4. If both are correct, display a success message.
5. 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.

```
#include <stdio.h>
#include <string.h>
#define USERNAME "User"
#define PASSWORD "Password123"

int main() {
   char user[50];
   char pass[50];

   printf("Enter the Username: ");
   scanf("%s", user);

   if (strlen(user) == 0) {
      printf("Username cannot be empty.\n");
      return 1;
```

```
    }

    printf("Enter the Password: ");
    scanf("%s", pass);

    if (strlen(pass) == 0) {
        printf("Password cannot be empty.\n");
        return 1;
    }

    if (strcmp(user, USERNAME) == 0 && strcmp(pass, PASSWORD) == 0) {
        printf("success %s.\n", user);
    }
    else if (strcmp(user, USERNAME) != 0 || strcmp(pass, PASSWORD) != 0) {
        printf("Error: Incorrect username or password.\n");
    }

    return 0;
}
```

Output

```
Enter the Username: ami
Enter the Password: po90
Error: Incorrect username or password.

Enter the Username: User
Enter the Password: Password123
success User.
```