

**Name of Student : kalpesh Kisan Naik**  
**Class : D4B**

**Roll No. : 29**  
**Date : 31/OCT/2023**

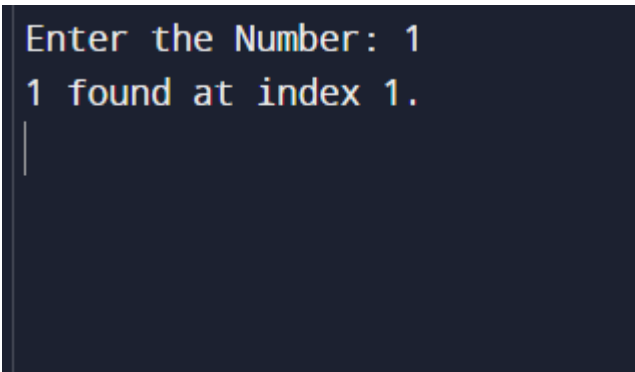
**Program Objective : Implement Linear Search in a given list of integers**

**Program Description :**

```
#include <stdio.h>

int linearSearch(int arr[], int size, int key) {
    for (int i = 0; i < size; i++) {
        if (arr[i] == key) {
            return i;
        }
    }
    return 0;
}

int main() {
    int arr[] = {0,1,2,3,4,5,6,7,8,9};
    int size = sizeof(arr) / sizeof(arr[0]);
    int key;
    printf("Enter the Number: ");
    scanf("%d", &key);
    int result = linearSearch(arr, size, key);
    if (result != 0) {
        printf("%d found at index %d.\n", key, result);
    } else {
        printf("%d not found.\n", key);
    }
    return 0;
}
```



```
Enter the Number: 1
1 found at index 1.
|
```

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**Program Objective : Display Matrix Multiplication**  
**Program Description :**

```
#include <stdio.h>

int main() {

    int matrix1[3][2] = {{1, 2}, {3, 4}, {5, 6}};

    int matrix2[2][3] = {{7, 8, 9}, {10, 11, 12}};

    int result[3][3] = {0};

    for (int i = 0; i < 3; i++) {

        for (int j = 0; j < 3; j++) {

            for (int k = 0; k < 2; k++) {

                result[i][j] += matrix1[i][k] * matrix2[k][j];

            }

        }

    }

    printf("Result of matrix multiplication:\n");

    for (int i = 0; i < 3; i++) {

        for (int j = 0; j < 3; j++) {

            printf("%d\t", result[i][j]);

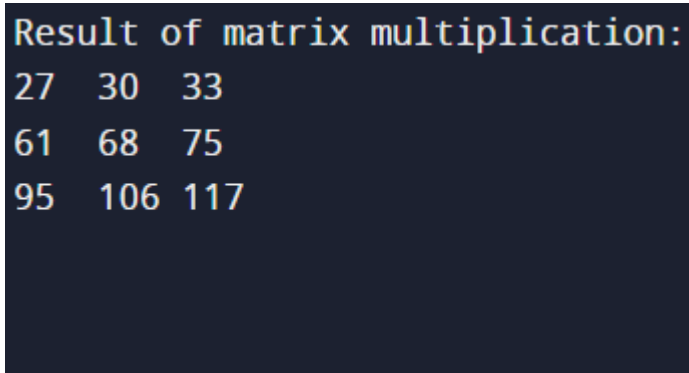
        }

        printf("\n");

    }

    return 0;

}
```



```
Result of matrix multiplication:
27  30  33
61  68  75
95  106 117
```

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**Program Objective : Matrix transposes of a matrix and upper and Lower Diagonal**  
**Program Description :**

```
#include <stdio.h>

int main() {

    int n;

    printf("Enter the dimension of the square matrix: ");

    scanf("%d", &n);

    int matrix[n][n];

    printf("Enter the elements of the matrix:\n");

    for (int i = 0; i < n; i++) {

        for (int j = 0; j < n; j++) {

            scanf("%d", &matrix[i][j]);

        }

    }

    int transpose[n][n];

    for (int i = 0; i < n; i++) {

        for (int j = 0; j < n; j++) {

            transpose[i][j] = matrix[j][i];

        }

    }

    int upper_diag_sum = 0, lower_diag_sum = 0;

    for (int i = 0; i < n; i++) {

        for (int j = 0; j < n; j++) {

            if (i <= j) {

                upper_diag_sum += matrix[i][j];

            }

            if (i >= j) {

                lower_diag_sum += matrix[i][j];

            }

        }

    }

}
```

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```
printf("Transpose of the matrix:\n");  
for (int i = 0; i < n; i++) {  
    for (int j = 0; j < n; j++) {  
        printf("%d\t", transpose[i][j]);  
    }  
    printf("\n");  
}  
  
printf("Sum of upper diagonal elements: %d\n", upper_diag_sum);  
printf("Sum of lower diagonal elements: %d\n", lower_diag_sum);  
return 0;  
}
```

```
Enter the dimension of the square matrix: 2  
Enter the elements of the matrix:  
1  
2  
3  
4  
Transpose of the matrix:  
1   3  
2   4  
Sum of upper diagonal elements: 7  
Sum of lower diagonal elements: 8
```

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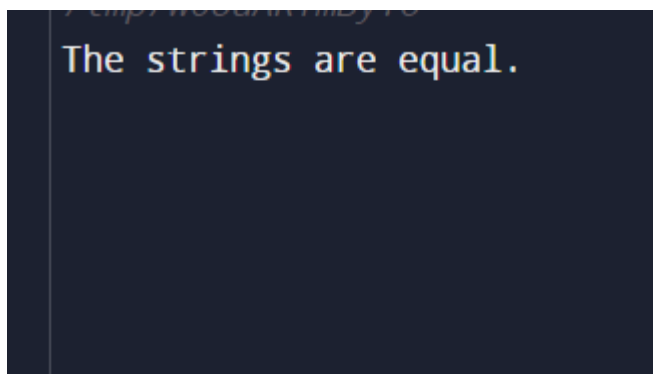
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**Program Objective : Compare two strings without using standard library function.**  
**Program Description :**

```
#include <stdio.h>

int compareStrings(char *str1, char *str2) {
    while (*str1 != '\0' && *str2 != '\0') {
        if (*str1 != *str2) {
            return 0;
        }
        str1++;
        str2++;
    }
    return (*str1 == '\0' && *str2 == '\0');
}

int main() {
    char str1[] = "kalpesh";
    char str2[] = "kalpesh";
    if (compareStrings(str1, str2)) {
        printf("The strings are equal.\n");
    } else {
        printf("The strings are not equal.\n");
    }
    return 0;
}
```



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**Program Objective :** Find the number of vowels, consonants, digits and white space in a string.

**Program Description :**

```
#include <stdio.h>

#include <ctype.h>

int main() {

    char str[100];

    int vowels = 0, consonants = 0, digits = 0, spaces = 0;

    printf("Enter a string: ");

    gets(str);

    for (int i = 0; str[i] != '\0'; i++) {

        char ch = tolower(str[i]);

        if (isalpha(ch)) {

            if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u') {

                vowels++;

            } else {

                consonants++;

            }

        } else if (isdigit(ch)) {

            digits++;

        } else if (isspace(ch)) {

            spaces++;

        }

    }

    printf("Vowels: %d\n", vowels);

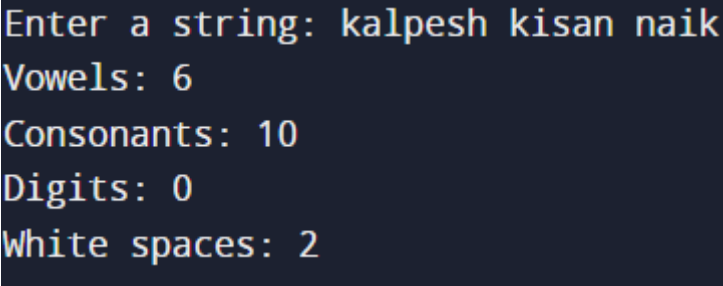
    printf("Consonants: %d\n", consonants);

    printf("Digits: %d\n", digits);

    printf("White spaces: %d\n", spaces);

    return 0;

}
```

A screenshot of a terminal window showing the output of the C program. The input string is "kalpesh kisan naik". The output shows: Vowels: 6, Consonants: 10, Digits: 0, and White spaces: 2.

```
Enter a string: kalpesh kisan naik
Vowels: 6
Consonants: 10
Digits: 0
White spaces: 2
```

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**Program Objective : Sorting the list of country names.**

**Program Description :**

```
#include <string.h>

void bubbleSort(char *arr[], int n) {

    int i, j;

    char *temp;

    for (i = 0; i < n - 1; i++) {

        for (j = 0; j < n - 1 - i; j++) {

            if (strcmp(arr[j], arr[j + 1]) > 0) {

                temp = arr[j];

                arr[j] = arr[j + 1];

                arr[j + 1] = temp;

            } } } }

int main() {

    char *countries[] = {"India", "Germany", "Spain", "United States", "Canada", "Australia"};

    int numCountries = sizeof(countries) / sizeof(countries[0]);

    bubbleSort(countries, numCountries);

    printf("\nSorted List of Countries:\n");

    for (int i = 0; i < numCountries; i++) {

        printf("%s\n", countries[i]);

    }

    return 0;

}
```



```
Sorted List of Countries:
Australia
Canada
Germany
India
Spain
United States
|
```

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**Program Objective : To check if the entered string is palindrome or not**  
**Program Description :**

```
#include <string.h>

#include <ctype.h>

int is_palindrome(const char *str) {

    int i = 0;

    int j = strlen(str) - 1;

    while (i < j) {

        while (i < j && !isalnum(str[i])) {

            i++;

        }

        while (i < j && !isalnum(str[j])) {

            j--;

        }

        if (tolower(str[i]) != tolower(str[j])) {

            return 0;

        }

        i++;

        j--;

    }

    return 1;

}

int main() {

    char input[100];

    printf("Enter a string: ");

    fgets(input, sizeof(input), stdin);

    if (is_palindrome(input)) {

        printf("The entered string is a palindrome.\n");

    } else {

        printf("The entered string is not a palindrome.\n");

    } return 0; }
```



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```
Enter a string: 1551  
The entered string is a palindrome.
```

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**Program Objective : Convert 1) Decimal to Binary 2) Binary to Decimal 3) Binary to Hex 4) Hex to Binary**

**Program Description :**

```
#include <stdio.h>

#include <math.h>

#include <string.h>

void decimalToBinary(int decimal) {

    int binary[32];

    int i = 0

    if (decimal == 0) {

        printf("Binary: 0\n");

        return;

    }

    while (decimal > 0) {

        binary[i] = decimal % 2;

        decimal = decimal / 2;

        i++;

    }

    printf("Binary: ");

    for (int j = i - 1; j >= 0; j--) {

        printf("%d", binary[j]);

    }

    printf("\n");

}

int binaryToDecimal(char binary[]) {

    int decimal = 0;

    int length = strlen(binary);

    for (int i = 0; i < length; i++) {

        decimal += (binary[i] - '0') * pow(2, length - 1 - i);

    }

    return decimal;

}
```

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```
}  
  
void binaryToHex(char binary[]) {  
    char hex[32];  
  
    int decimal = binaryToDecimal(binary);  
  
    sprintf(hex, "%X", decimal);  
  
    printf("Hexadecimal: %s\n", hex);  
}  
  
void hexToBinary(char hex[]) {  
    int decimal;  
  
    sscanf(hex, "%X", &decimal);  
  
    int binary[32];  
  
    int i = 0;  
  
    while (decimal > 0) {  
        binary[i] = decimal % 2;  
        decimal = decimal / 2;  
        i++;  
    }  
  
    printf("Binary: ");  
  
    for (int j = i - 1; j >= 0; j--) {  
        printf("%d", binary[j]);  
    }  
  
    printf("\n");  
}  
  
int main() {  
    int choice;  
  
    printf("Choose Conversion Type:\n");  
  
    printf("1. Decimal to Binary\n");  
  
    printf("2. Binary to Decimal\n");  
  
    printf("3. Binary to Hexadecimal\n");  
  
    printf("4. Hexadecimal to Binary\n");  
  
    printf("Enter your choice (1/2/3/4): ");
```

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```
scanf("%d", &choice);
if (choice == 1) {
    int decimal;
    printf("Enter a decimal number: ");
    scanf("%d", &decimal);
    decimalToBinary(decimal);
} else if (choice == 2) {
    char binary[32];
    printf("Enter a binary number: ");
    scanf("%s", binary);
    int decimal = binaryToDecimal(binary);
    printf("Decimal: %d\n", decimal);
} else if (choice == 3) {
    char binary[32];
    printf("Enter a binary number: ");
    scanf("%s", binary);
    binaryToHex(binary);
} else if (choice == 4) {
    char hex[32];
    printf("Enter a hexadecimal number: ");
    scanf("%s", hex);
    hexToBinary(hex);
} else {
    printf("Invalid choice.\n");
}

return 0;
}
```

```
Choose Conversion Type:
1. Decimal to Binary
2. Binary to Decimal
3. Binary to Hexadecimal
4. Hexadecimal to Binary
Enter your choice (1/2/3/4): 4
Enter a hexadecimal number: 2DE45
Binary: 101101111001000101
```

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**Program Objective : Find value of resistor if color code is provided**

**10. Sorting of Numbers.**

**Program Description :**

```
#include <stdio.h>

#include <string.h>

int main() {

    char* colors[] = {"black", "brown", "red", "orange", "yellow", "green", "blue", "violet", "gray",
"white"};

    int values[] = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9};

    char band1[20], band2[20], band3[20];

    printf("Enter the colors for the 1st, 2nd, and 3rd bands (e.g., red green blue): ");

    scanf("%s %s %s", band1, band2, band3);

    int value1 = -1, value2 = -1, multiplier = -1;

    for (int i = 0; i < 10; i++) {

        if (strcmp(band1, colors[i]) == 0) {

            value1 = values[i];

        }

        if (strcmp(band2, colors[i]) == 0) {

            value2 = values[i];

        }

        if (strcmp(band3, colors[i]) == 0) {

            multiplier = 10;

            for (int j = 0; j < i; j++) {

                multiplier *= 10;

            }

        }

    }

    if (value1 != -1 && value2 != -1 && multiplier != -1) {

        int resistance = (value1 * 10 + value2) * multiplier;

        printf("The resistance value is %d ohms.\n", resistance);

    } else {

        printf("Invalid color code.\n");

    }

    return 0; }
```

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```
Enter the colors for the 1st, 2nd, and 3rd bands (e.g., red green blue): red yellow  
green  
The resistance value is 24000000 ohms.  
|
```

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**Program Objective : Sorting of Numbers.**

**Program Description :**

```
#include <stdio.h>

void bubbleSort(int arr[], int n) {

    int i, j;

    int temp;

    for (i = 0; i < n - 1; i++) {

        for (j = 0; j < n - 1 - i; j++) {

            if (arr[j] > arr[j + 1]) {

                temp = arr[j];

                arr[j] = arr[j + 1];

                arr[j + 1] = temp;

            }

        }

    }

}

int main() {

    int num[] = {1, 9, 7, 8, 5, 4, 3, 2, 6};

    int num_size = sizeof(num) / sizeof(num[0]);

    bubbleSort(num, num_size);

    printf("\nSorted List of num:\n");

    for (int i = 0; i < num_size; i++) {

        printf("%d\n", num[i]);

    }

    return 0;

}
```

Sorted List of num:

1  
2  
3  
4  
5  
6  
7  
8  
9

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**Program Objective : Using pointer write Hello World.**  
**Program Description :**

```
#include <stdio.h>

int main() {

    char str[] = "Hello, World!";

    char *ptr = str;

    while (*ptr != '\0') {

        printf("%c", *ptr);

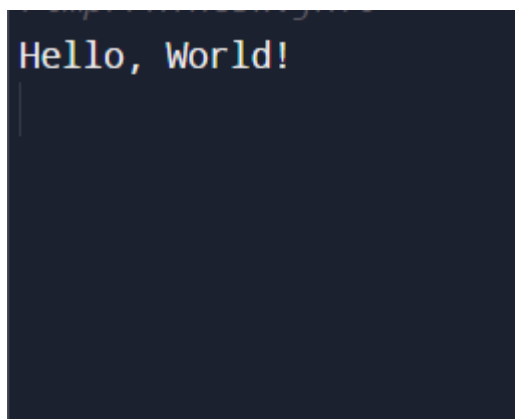
        ptr++;

    }

    printf("\n");

    return 0;

}
```

A screenshot of a terminal window with a dark background. The text "Hello, World!" is displayed in a light blue or cyan monospaced font. A vertical cursor line is visible to the left of the text.



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**Program Objective : Call by reference- swap function.**  
**Program Description :**

```
#include <stdio.h>

int main() {

    int x = 10;

    int *ptr1 = &x;

    int *ptr2;

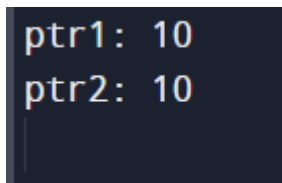
    ptr2 = ptr1;

    printf("ptr1: %d\n", *ptr1);

    printf("ptr2: %d\n", *ptr2);

    return 0;

}
```

A screenshot of a terminal window with a dark background. It displays the output of the program: "ptr1: 10" on the first line and "ptr2: 10" on the second line. The text is in a light color, likely white or light blue, with a monospaced font. There is a vertical scrollbar on the right side of the terminal window.

```
ptr1: 10
ptr2: 10
```

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**Program Objective : Call by reference- check the equality operator.**

**Program Description :**

```
#include <stdio.h>

int main() {

    int x = 10;

    int *ptr;

    ptr = &x;

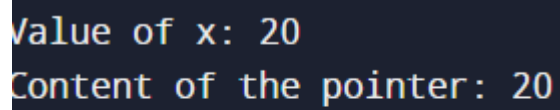
    *ptr = 20;

    printf("Value of x: %d\n", x);

    printf("Content of the pointer: %d\n", *ptr);

    return 0;

}
```

A screenshot of a terminal window with a dark background. It shows the output of the C program: "Value of x: 20" on the first line and "Content of the pointer: 20" on the second line. The text is in a light-colored, monospaced font.

Value of x: 20  
Content of the pointer: 20

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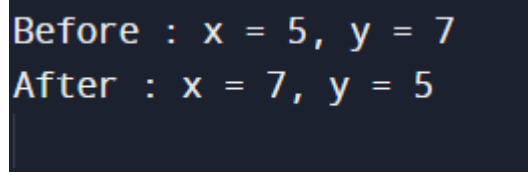
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**Program Objective : swapping of two number.**  
**Program Description :**

```
#include <stdio.h>

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

int main() {
    int x = 5, y = 7;
    printf("Before : x = %d, y = %d\n", x, y);
    swap(&x, &y);
    printf("After : x = %d, y = %d\n", x, y);
    return 0;
}
```



Before : x = 5, y = 7  
After : x = 7, y = 5

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**Program Objective :** check operators, using pointer by function.

**Program Description :**

```
#include <stdio.h>

int add(int a, int b);

int subtract(int a, int b);

int main() {

    int (*operation)(int, int);

    operation = add;

    int result = operation(5, 5);

    printf("Result of addition: %d\n", result);

    operation = subtract;

    result = operation(5, 5);

    printf("Result of subtraction: %d\n", result);

    return 0;

}

int add(int a, int b) {

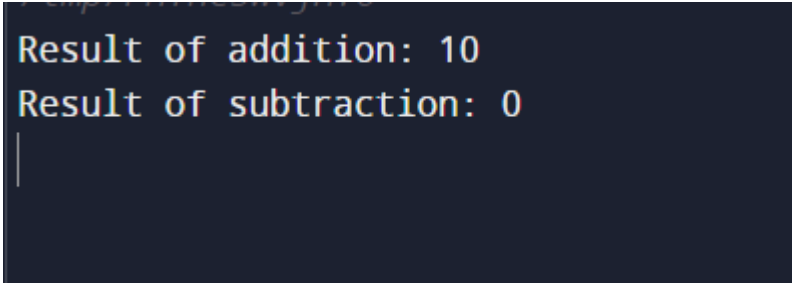
    return a + b;

}

int subtract(int a, int b) {

    return a - b;

}
```

A screenshot of a terminal window with a dark background. It shows the output of the C program: "Result of addition: 10" on the first line and "Result of subtraction: 0" on the second line. A vertical cursor is visible on the line following the subtraction result.

```
Result of addition: 10
Result of subtraction: 0
|
```