Department of Electronics & Telecommunication Engineering
Data Structures & Algorithms Lab (DJS22EL505)

Experiment no: 1 Date: 1/08/2024

Aim: To review the principles and syntax of C and Java programming

Software Language: C and Java

Theory:

C programming:

C programming is a powerful general-purpose language that was developed in the early 1970s by Dennis Ritchie at Bell Labs. C provides low-level access to memory through the use of pointers and allows for direct manipulation of hardware. It is widely used in system programming, developing operating systems, and embedded systems. C's syntax and concepts have influenced many other modern programming languages, making it a fundamental language for computer science education and a crucial skill for developers.

Java programming:

Java programming is a versatile, object-oriented language developed by Sun Microsystems in the mid-1990s. Known for its "write once, run anywhere" capability, Java allows developers to create cross-platform applications that can run on any device with a Java Virtual Machine (JVM). Its robust libraries, strong memory management, and security features make it a popular choice for building enterprise-level applications, web services, and Android apps. Java's syntax and structure promote code readability and reusability, making it an essential language for modern software development.

Programs:

1) Write a program to check whether a number is prime or not
    - Write the code in C inside void main function
    - Write the code in C by creating a separate function isprime ().
    - Write the code in Java
2) Write a program to count number of characters and digits in a string
    - Write the code in C inside void main function
    - Write the code in Java
3) Write a program to traverse and print the array
    - Write the code in C inside void main function (Initialize the array in the code)
    - Write the code in C inside void main function (Take input from user)
    - Write the code in Java inside the main class

Code:

1.

- **Write the code in C inside void main function**

isprime.c > main()

```c
#include<stdio.h>

int main()
{
    int a,check=0;
    scanf("%d",&a);
    for(int i = 2; i <= a/2; i++)
    {
        if(a%i==0)
        {
            check++;
        }
    }

    if(check)
    {
        printf("Number is not prime.");
    }
    else
    {
        printf("Number is prime.");
    }
    return 0;
}
```

- Output :

```
22
Number is not prime.
```

```
23
Number is prime.
```

- **Write the code in C by creating a separate function isprime ().**

isprimefunc.c > isprime(int)

```c
#include<stdio.h>
int isprime(int x);
int main()
{
    int a,ans;
    scanf("%d",&a);
    ans = isprime(a);

    if(ans)
    {
        printf("Number is not prime.");
    }
    else
    {
        printf("Number is prime.");
    }
    return 0;
}

int isprime(int x)
{
    int check=0;
    for(int i = 2; i <= x/2; i++)
    {
        if(x%i==0)
        {
            check++;
        }
    }
    return check;
}
```

Output:

```
11
Number is prime.
```

```
25
Number is not prime.
```

- **Write the code in Java**

Main.java > Main

```java
import java.util.*;

public class Main
{
    Run | Debug
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        int a,check=0;
        System.out.println("Enter the number : ");
        a = sc.nextInt();

            for(int i = 2; i <= a/2; i++)
            {
            if(a%i==0)
            {
                check++;
            }
            }

            if(check>0)
            {
                System.out.println("Number is not prime.");
            }
            else
            {
                System.out.println("Number is prime.");
            }
    }
}
```

Output :

```
23
Number is prime.
```

```
25
Number is not prime.
```

2.

- **Write the code in C inside void main function**

count.c > main()

```c
#include<stdio.h>

int main()
{
    char str[30];
    int alpha=0,digit=0;
    printf("Enter the string : ");
    scanf("%[^\n]s",&str);
    for(int i = 0; i < strlen(str);i++)
    {
        if(isalpha(str[i]))
        {
            alpha++;
        }
        if(isdigit(str[i]))
        {
            digit++;
        }
    }
    printf("Digits = %d and Characters = %d",digit,alpha);
    return 0;
}
```

Output :

```
Enter the string : No one called 9837392
Digits = 7 and Characters = 11[1] + Done
```

Note : [1] + done is just part of running code on vscode. Not output

- **Write the code in Java**

count.java > ...

```java
import java.util.Scanner;

public class count {
    Run | Debug
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String str;
        int chr=0,digits=0;
        System.out.println("Enter the string");
        str = sc.nextLine();

        for ( int i = 0 ; i < str.length();i++)
        {
            if(str.charAt(i)!=' ')
            {
                chr++;
            }
            if (str.charAt(i) >= 48 && str.charAt(i) <= 57)
            {
                digits++;
            }
        }
        int count = chr - digits;
        System.out.println("Digits = "+digits+"  Characters = " + count);
    }
}
```

Output:

```
Enter the string
No time to die 007
Digits = 3  Characters = 11
```

3.

- Write the code in C inside void main function (Initialize the array in the code)

ftraversearray.c > main()

```c
#include<stdio.h>

int main()
{
    int num[] = {1,2,3,4,5,6};
    int l = sizeof(num)/sizeof(num[0]);
    for( long i = 0; i < l ; i++)
    {
        printf("%d\t",num[i]);
    }
    return 0;
}
```

Output :

```
1       2       3       4       5       6
```

- **Write the code in C inside void main function (Take input from user)**

traversearray.c > main()

```c
#include<stdio.h>

int main()
{
    int num[10];
    int n;
    printf("Enter the number of elements u wanna enter :");
    scanf("%d",&n);

    for(int i =0 ; i < n ; i++)
    {
        printf("Enter the %d element of the array : ",i);
        scanf("%d",&num[i]);
    }
    for( int i = 0; i < n ; i++)
    {
        printf("%d\t",num[i]);
    }
    return 0;
}
```

Output:

```
Enter the number of elements u wanna enter :4
Enter the 0 element of the array : 2
Enter the 1 element of the array : 6
Enter the 2 element of the array : 4
Enter the 3 element of the array : 9
2       6       4       9       [1] + Done
```

- **Write the code in Java inside the main class**

```java
public class array {
    Run | Debug
    public static void main(String[] args) {
        int[] arr = new int[]{1,2,4,5,6};
        for(int i = 0; i < arr.length;i++)
        {
            System.out.print(arr[i]+"\t");
        }
    }
}
```

Output :

```
1	2	4	5	6
```

Result and conclusion : Thus, we revised previous coding concepts of C and Java and solved basic question.