Shreyas Sawant
D7A-55

AIM: To implement Strings in Java

THEORY

- Strings in Java

In Java, a String a sequence of characters. But, unlike many other languages that implement strings as character arrays, Java implements strings as objects of type String.
When you create a String object, you are creating a string that cannot be changed. That is once String object has been created, you cannot change characters that compromise that string. You can still perform all types of string operations. The difference is that each time you need an altered version of an existing string, a new String object is created that contains the modifications. The original string is left unchanged. This approach is used because fixed, immutable strings can be implemented more efficiently than changeable ones.
To say that the strings within objects of type Sting are unchangeable means that contents of String instance cannot be changed after it has been created. However a variable declared as a String reference can be changed to point at some other String object at any time.

- String Class Constructors

1) To create an empty String, you call the default constructor. For example
```
String s = new String();
```
will create an instance of String with no characters in it.

2) To create a String intiallized by an array of characters, use this constructor:

String (char chars[])

For eg

```
char chars[] = {'a', 'b', 'c'};
String s = new String (chars);
```

This constructor intializes s with string "abc".

3) Specifying a subrange of character array as an initializer using the following constructor:

String (char chars[], int startIndex, int numChars)

Here startindex specifies the index at which the subrange starts, and numChars specifies the number of characters to use.

For eg

```
char chars[] = {'a', 'b', 'c', 'd', 'e', 'f'};
String s = new String (chars, 2, 3);
```

This intializes s with "cde".

4) Constructing a String object that contains same character sequence as another String object using this constructor:

String (String strObj)

For eg

```
char c[] = {'H', 'i'};
String s1 = new String (c);
String s2 = new String (s1);
System.out.println (s2);
```

This prints "Hi".

- String Functions

1) String length

The length of a string is the number of character it contains. To obtain this value, call length() method

For eg.

```
class Test
{ public static void main (String args[])
  { char chars[] = {'a', 'i', 'c', 'b'};
    String s = new String(c);
    System.out.println("The length is : " + s.length());
  }
}
```

Output:

The length is : 4

2) charAt()

To extract a single character from a String, you can refer directly to an individual character using charAt() method.

Syntax: char charAt(int where)

'where' is the index which is to be refered.

For eg

```
class Test
{ public static void main(String args[])
  { String s = "Nice drawing";
    System.out.println(s.charAt(3));
  }
}
```

Output:-

e

3) equals ()

To compare two strings for equality use equals ()

Syntax: boolean equals (Object str)

str is the String object which is being compared with invoking String object. It returns true if the string contains same character in same order, else returns false.

The comparison is case sensitive.

```
class Test
{
    public static void main(String args[])
    {
        String s = "Hello";
        String s1 = "hello";
        String s2 = "Hello";
        System.out.println(s.equals(s1));
        System.out.println(s.equals(s2));
    }
}
```

Output:

false

true

4) substring ()

To extract a substring from the String we can use substring () method

It has two forms:

1) String substring (int startindex);
2) String substring (int startindex, int endindex)

startindex indicates the beginning index and end index specifies stopping point.

For eg

```
class Test
{ public static void main (String args[])
  { String s= " It is a good day. "
    String s1 = s. substring (8);
    String s2 = s. substring (1, 8);
    System. out. println (*s1 + "\n" + s2);
  } }
```

Output:

good day.
t is a

5) concat()

To concaterate two strings concat() is used

Syntax : String concat (String str)

This method creates a new object that contains the invoking string with the contents of str appended to the end. concat() performs same function as +. For eg

~~String s1 = one~~

```
class Test
{ pubic static void main ( string oragrs[])
  { String s1 = "Good"
    String s2 = "bye" ; s1. concat ("bye");
    System. out. println (s2);
  }
}
```

Output:

Goodbye

6) replace()

The replace() method has two forms. The first replaces all occurrences of one character in invoking string with another character.

Syntax: replace(char original, char replacement)

The second form of replace() replaces one character sequence with another.

Syntax: replace(CharSequence original, CharSequence replacement)

For eg

```
class Test
{ public static void main (String args[])
  { System.out.println (" "Mississippi".replace('s','i'));
  }
}
```

Output:

Miiiiiippi

7) trim()

The trim() method returns a copy of the invoking string from which any leading and trailing whitespace has been removed.

Syntax: String trim()

For eg

```
class Test
{ public static void main (String args[])
  { System.out.println ("   H  i  ".trim());
  }
}
```

Output:

H i

8) toUpperCase() / toLowerCase()

The toLowerCase() method converts all characters in string from uppercase to lowercase.

The toUpperCase() method converts all characters in string from lowercase to uppercase.

Syntax: String toUpperCase()
String toLowerCase()

For eg:

```
class Test
{ public static void main(String args[])
  { String s = "Hello all, Have a good day".
    System.out.println(s.toUpperCase());
    System.out.println(s.toLowerCase());
  }
}
```

Output

HELLO ALL, HAVE A GOOD DAY.
hello all, have a good day.

CONCLUSION:

- Errors encountered

1) Declared a string b as:
String b;
to store the reverse of String a, but it b gets declared as a null string

Solution: Declare b as: String b = ""; so that b = b + a.charAt(i) works properly.

2) Incorrect syntax for declaring a string a variable

Syntax used: String a, b=" ";

Solution Correct Syntax: String a, b=" ";

LAB 5: STRINGS IN JAVA

Name: Shreyas Sawant Div: D7A Roll No.: 55

Q.1 Write a program to find a particular character on the given index. Take index from user.

CODE:

findindex - Notepad

File Edit Format View Help

```
import java.util.*;
class findindex
{ public static void main(String args[])
{       Scanner s=new Scanner(System.in);
        String a;int b;
        System.out.println("Enter a string");
        a=s.nextLine();
        System.out.println("Enter the index of which the character is to be known");
        b=s.nextInt();
        for(int i=0;i<a.length();i++)
        {
                if(b==i)
                {
                        System.out.println("Character at index "+i+" is "+a.charAt(i));break;
                }
        }
}
}
```

Ln 14, Col 73 110% Windows (CRLF) UTF-8

OUTPUT:

C:\Windows\System32\cmd.exe

```
Microsoft Windows [Version 10.0.19043.1288]
(c) Microsoft Corporation. All rights reserved.

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>javac findindex.java

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>java findindex
Enter a string
It is a fine day.
Enter the index of which the character is to be known
6
Character at index 6 is a

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>java findindex
Enter a string
Nice to see you.
Enter the index of which the character is to be known
9
Character at index 9 is e

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>
```

Q.2 Write a program to reverse the string.

CODE:

RevString - Notepad

File Edit Format View Help

```
import java.util.*;
class RevString
{ public static void main(String args[])
{       Scanner s=new Scanner(System.in);
        System.out.println("Enter the string to be reversed");
        String a=s.nextLine(),b="";
        for(int i=a.length()-1;i>-1;i--)
        {
                b=b+a.charAt(i);
        }
        System.out.println("\nReversed String: "+b);
}
}
```

Ln 11, Col 41 120% Windows (CRLF) UTF-8

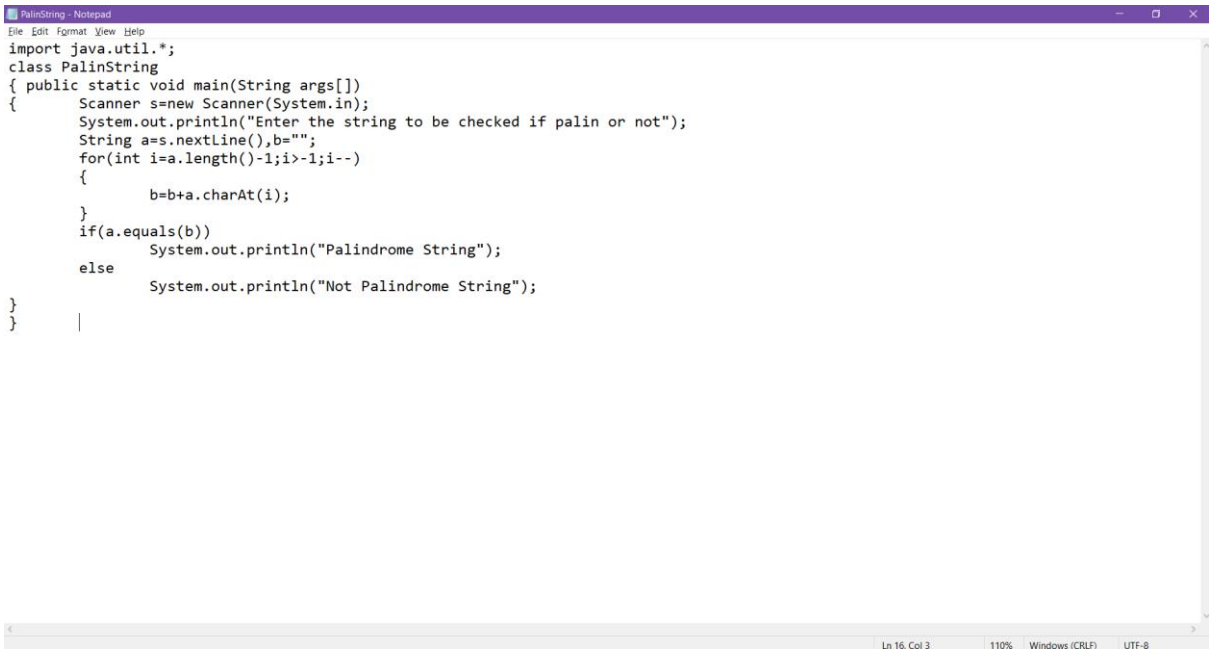
OUTPUT:

C:\Windows\System32\cmd.exe

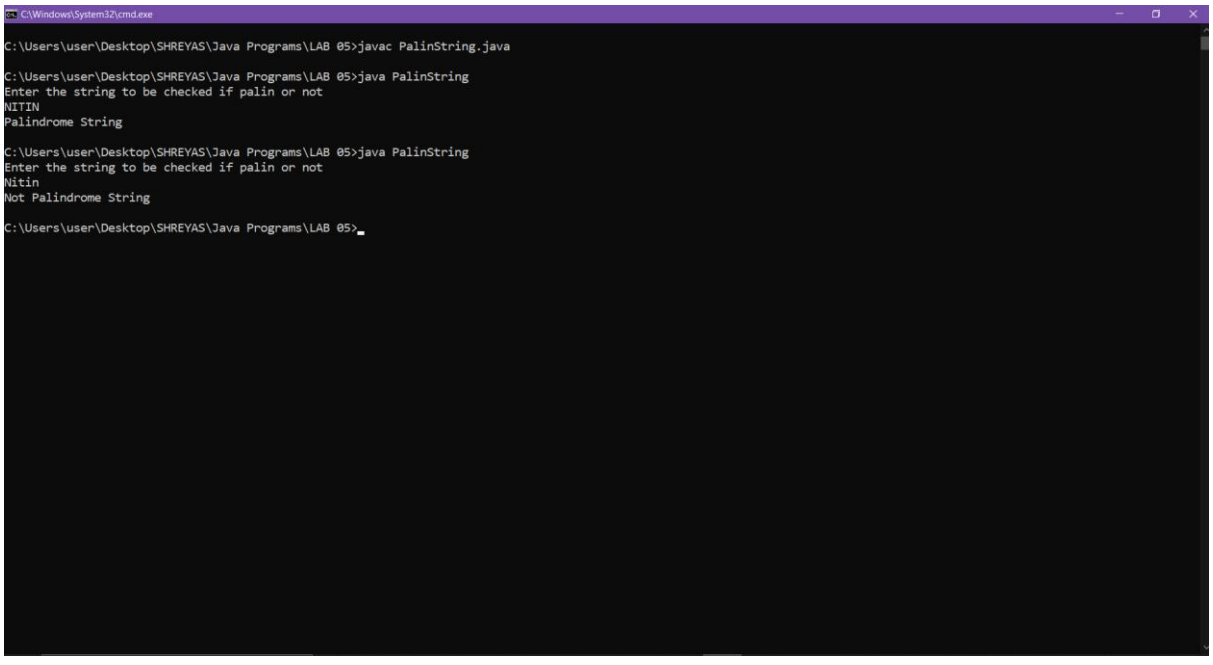
```
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>javac RevString.java

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>java RevString
Enter the string to be reversed
It is good day when sun shines bright.

Reversed String: .thgirb senihs nus nehw yad doog si tI

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>java RevString
Enter the string to be reversed
Guptill's runout stil gives trauma to Indians.

Reversed String: .snaidnI ot amuart sevig lits tuonur s'llitpuG

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>
```

Q.3 Write a program to check if the given string is palindrome or not.

CODE:

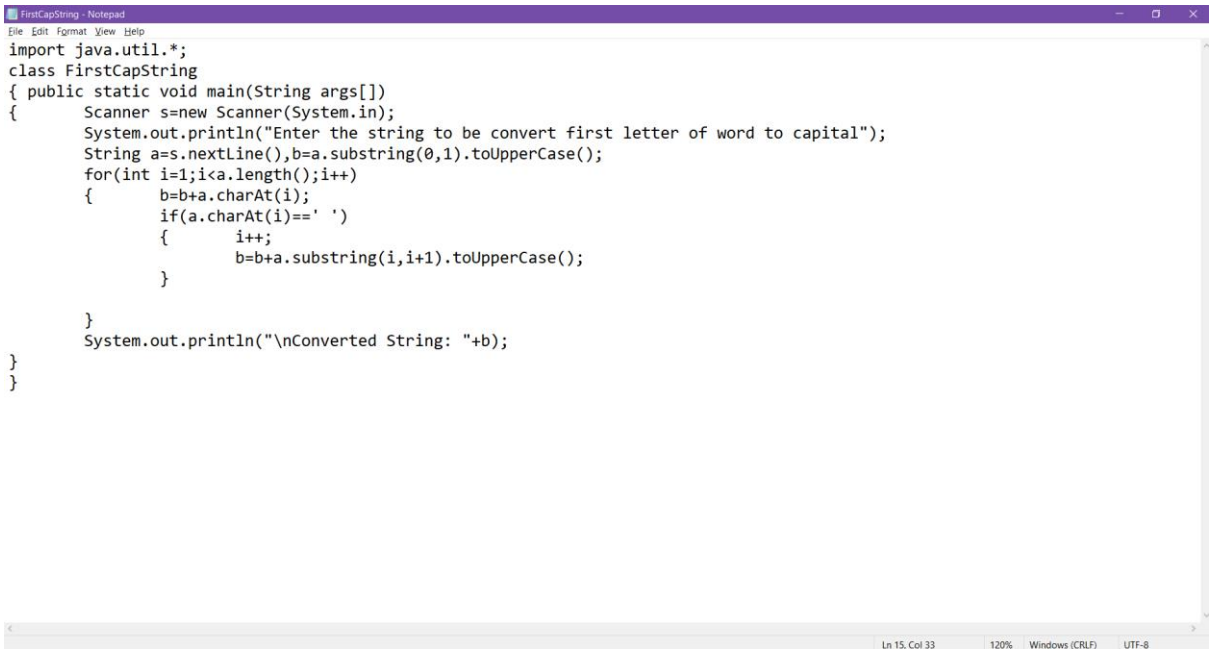



OUTPUT:



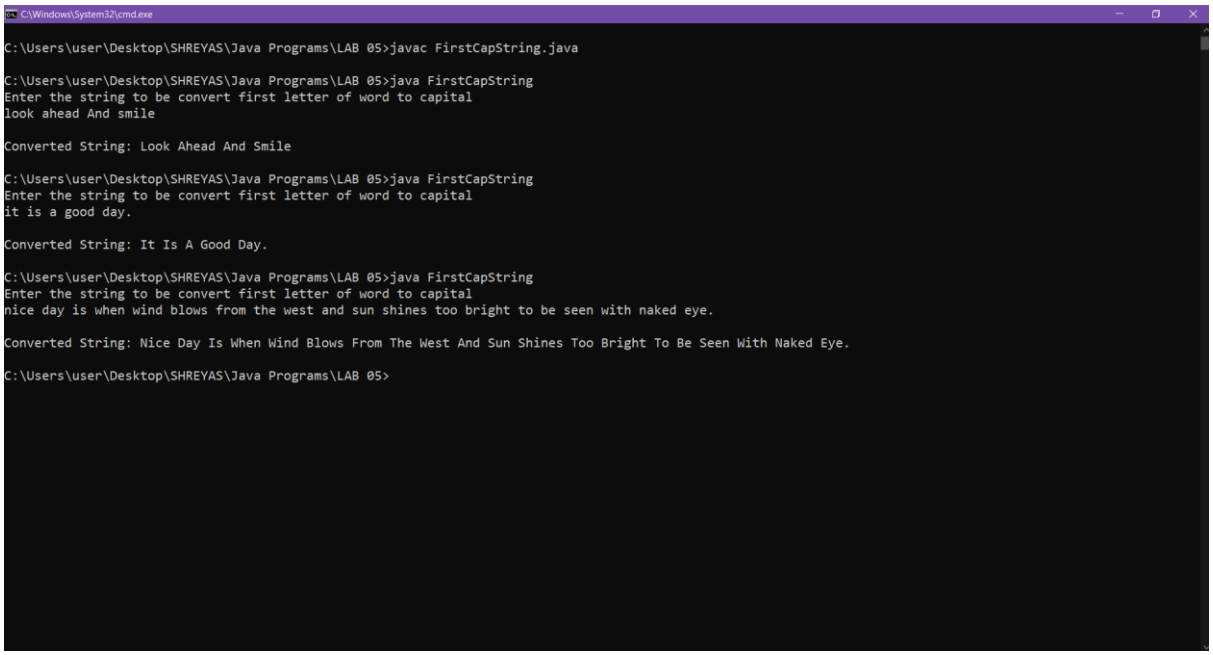
Q.4 Write a program to convert starting letter of each word in a long string to uppercase.

CODE:



```
import java.util.*;
class FirstCapString
{ public static void main(String args[])
{       Scanner s=new Scanner(System.in);
        System.out.println("Enter the string to be convert first letter of word to capital");
        String a=s.nextLine(),b=a.substring(0,1).toUpperCase();
        for(int i=1;i<a.length();i++)
        {       b=b+a.charAt(i);
                if(a.charAt(i)==' ')
                {       i++;
                        b=b+a.substring(i,i+1).toUpperCase();
                }

        }
        System.out.println("\nConverted String: "+b);
}
}
```

OUTPUT:



```
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>javac FirstCapString.java

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>java FirstCapString
Enter the string to be convert first letter of word to capital
look ahead And smile

Converted String: Look Ahead And Smile

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>java FirstCapString
Enter the string to be convert first letter of word to capital
it is a good day.

Converted String: It Is A Good Day.

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>java FirstCapString
Enter the string to be convert first letter of word to capital
nice day is when wind blows from the west and sun shines too bright to be seen with naked eye.

Converted String: Nice Day Is When Wind Blows From The West And Sun Shines Too Bright To Be Seen With Naked Eye.

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 05>
```