Unit-1: Basics of Java

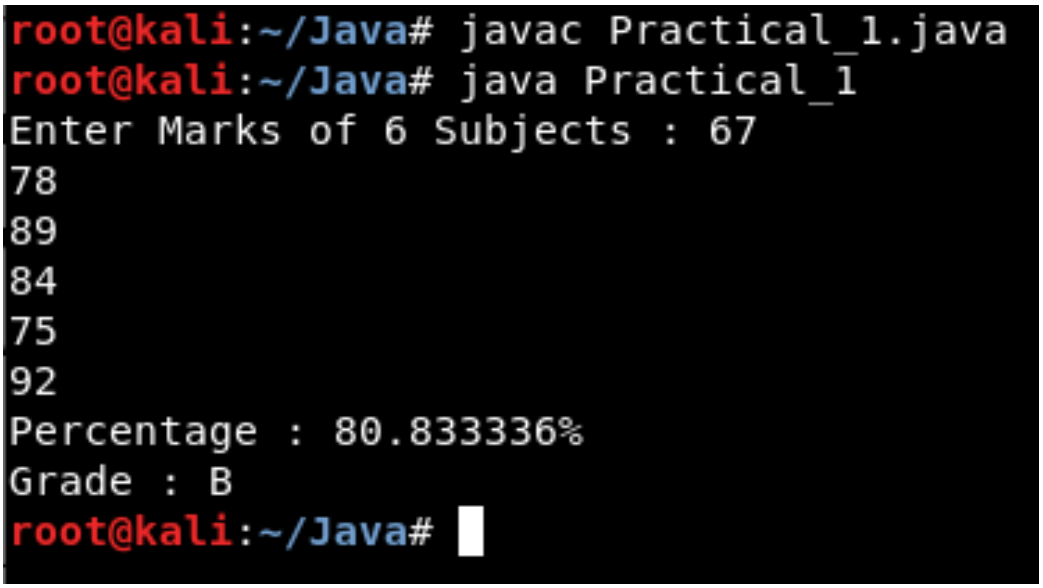
Practical-1:
Write a program that calculate percentage marks of the student for six subjects and display grade.

Program:

```
import java.util.Scanner;
class StudentMarks
{
	static int[] mark = new int[6];
	static char grade;
	static float per;
	public static void calculate()
	{
		int total=0;
		for (int i=0; i<6; i++)
			total += mark[i];
		per = (float) total/6;
		if (per > 85.0f)
			grade = 'A';
		else if (per > 75.0f)
			grade = 'B';
		else if (per > 65.0f)
			grade = 'C';
		else if (per > 50.0f)
			grade = 'D';
		else if (per > 35.0f)
			grade = 'E';
		else
			grade = 'F';
	}
	public static void display()
	{
		System.out.println("Percentage : "+per+"%");
		System.out.println("Grade : "+grade);
	}
}
```

```
public class Practical_1
{
	public static void main(String[] args)
	{
		Scanner sc = new Scanner(System.in);
		StudentMarks st = new StudentMarks();
		System.out.print("Enter Marks of 6 Subjects : ");
		for (int i=0; i<6; i++)
			st.mark[i] = sc.nextInt();
		st.calculate();
		st.display();
	}
}
```

Output:



Practical-2:
Write a program to enter two numbers and perform mathematical operations on them.

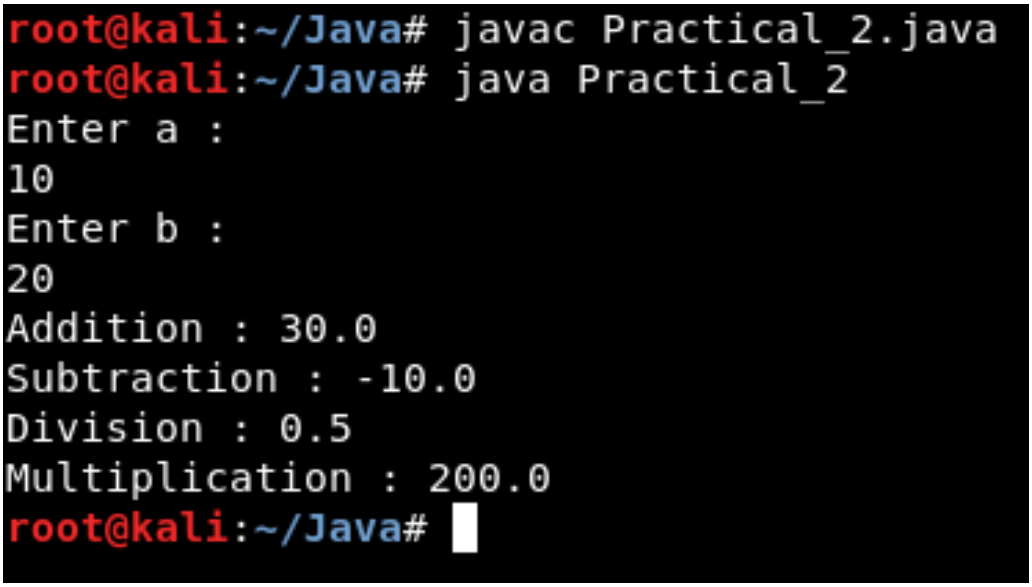
Program:

```
import java.util.Scanner;
class Math
{
	static double a, b;
	public static double add ()
	{
		return (a+b);
	}
	public static double subtract ()
	{
		return (a-b);
	}
	public static double divide ()
	{
		return (a/b);
	}
	public static double multiply ()
	{
		return (a*b);
	}
}

public class Practical_2
{
	public static void main (String[] args)
	{
		Scanner sc = new Scanner (System.in);
		Math m = new Math();
		System.out.println("Enter a : ");
		m.a = sc.nextDouble();
		System.out.println("Enter b : ");
		m.b = sc.nextDouble();
		System.out.println("Addition : "+m.add());
```

```
            System.out.println("Subtraction : "+m.subtract());
            System.out.println("Division : "+m.divide());
            System.out.println("Multiplication : "+m.multiply());
        }
}
```

Output:



Unit-2: Array and String

Practical-3:
Write a simple java application that sorts the integer numbers passed through command line.

Program:

```
import java.util.Scanner;
class SortNumber
{
	public static void sort(int[] a,int n)
	{
		int temp;
		for (int i=1; i<n; i++)
			for (int j=0; j<i; j++)
				if (a[i] < a[j])
				{
					temp = a[i];
					a[i] = a[j];
					a[j] = temp;
				}
	}
}

public class Practical_3
{
	public static void main(String[] args)
	{
		int n = Integer.parseInt(args[0]);
		int[] num = new int[n];
		Scanner sc = new Scanner (System.in);
		for (int i=1; i<=n; i++)
			num[i-1] = Integer.parseInt(args[i]);
		SortNumber s = new SortNumber();
		s.sort(num,n);
		System.out.println("----------Sorted Numbers----------");
		for (int i=0; i<n; i++)
			System.out.print(num[i]+"\t");
		System.out.println();
```

```
        }
}
```

Output:

```
root@kali:~/Java# javac Practical_3.java
root@kali:~/Java# java Practical_3 5 9 17 5 11 3
-------------Sorted Numbers------------
3       5       9       11      17
root@kali:~/Java#
```

Practical-4:
Write a program to find length of string and print second half of the string.

Program:

```
import java.util.Scanner;
class Practical_4
{
        public static int len(String s)
        {
                int n;
                n = s.length();
                return n;
        }

        public static void display(char[] s,int n)
        {
                System.out.println("Length : "+n);
                System.out.print("Half String : ");
                for (int i=0; i<(n+1)/2; i++)
                        System.out.print(s[i]);
                System.out.println();
        }
```

```
        public static void main(String[] args)
        {
                Scanner sc = new Scanner (System.in);
                String str;
                System.out.print("Enter String : ");
                str = sc.nextLine();
                int n = len(str);
                display(str.toCharArray(),n);
        }
}
```

Output:

```
root@kali:~/Java# javac Practical_4.java
root@kali:~/Java# java Practical_4
Enter String : I am in Scet College
Length : 20
Half String : I am in Sc
root@kali:~/Java#
```

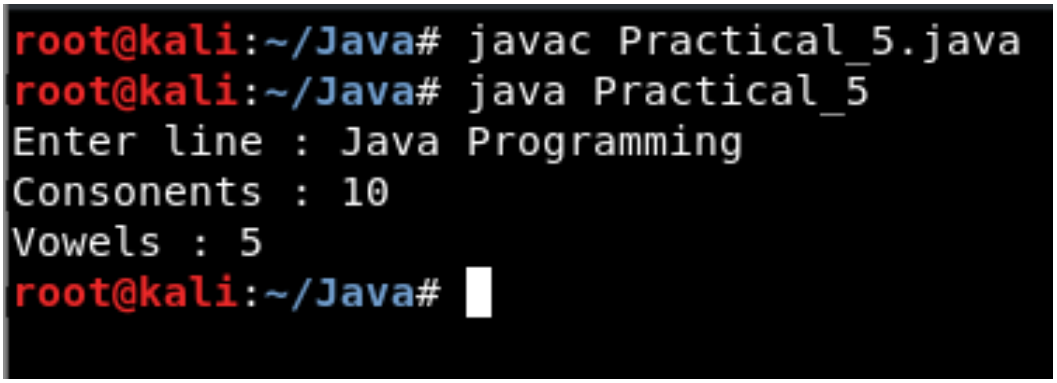
Practical-5:
Write a program to accept a line and check how many consonants and vowels are there in line.

Program:

```
import java.util.Scanner;
class Practical_5
{
	public static void calculate(char s[],int n)
	{
		int cc = 0 ,cv = 0;
		for (int i=0; i<n; i++)
		{
			if (Character.isLetter(s[i]))
			{
				if (s[i]=='a' || s[i]=='e' || s[i]=='i' || s[i]=='o' || s[i]=='u')
					cv++;
				else
					cc++;
			}
		}
		System.out.println("Consonents : "+cc);
		System.out.println("Vowels : "+cv);
	}

	public static void main(String[] args)
	{
		Scanner sc = new Scanner (System.in);
		String str;
		System.out.print("Enter line : ");
		str = sc.nextLine();
		str.toLowerCase();
		calculate(str.toCharArray(),str.length());
	}
}
```

Output:


root@kali:~/Java# javac Practical_5.java
root@kali:~/Java# java Practical_5
Enter line : Java Programming
Consonents : 10
Vowels : 5
root@kali:~/Java#

Practical-6:
Write a program to count the number of words that start with capital letters.

Program:

```
import java.util.Scanner;
class Practical_6
{
	public static boolean checkcap(char c)
	{
		if (Character.isUpperCase(c))
			return true;
		else
			return false;
	}

	public static void main(String[] args)
	{
		Scanner sc = new Scanner (System.in);
		String str;
		System.out.print("Enter String : ");
		str = sc.nextLine();
		int c=0,i=0;
		char[] s = new char[str.length()];
		s = str.toCharArray();
		if (checkcap(s[i++]))
			c++;
		while(i<str.length())
		{
			if (s[i++]==' ')
				if (checkcap(s[i++]))
					c++;
		}
		System.out.println("Total Count : "+c);
	}
}
```

Output:

```
root@kali:~/Java# javac Practical_6.java
root@kali:~/Java# java Practical_6
Enter String : Hii this is Java Programming
Total Count : 3
root@kali:~/Java#
```

Practical-7:
Write a program to find that given number or string is palindrome or not.

Program:

```
import java.util.Scanner;
class Practical_7
{
	public static void reverse(char[] s,char[] r,int n)
	{
		for (int i=0; i<n; i++)
		{
			r[n-i-1] = s[i];
		}
	}

	public static void main(String[] args)
	{
		Scanner sc = new Scanner (System.in);
		String str1,str2;
		System.out.print("Enter Line : ");
		str1 = sc.nextLine();
		char[] s = new char[str1.length()];
		char[] r = new char[str1.length()];
		s = str1.toCharArray();
		reverse(s,r,str1.length());
		int c=0;
		for (int i=0; i<str1.length(); i++)
			if (s[i]==r[i])
				c++;
		if (c==str1.length())
			System.out.println("String is palindrome");
		else
			System.out.println("String is not palindrome");
	}
}
```

Output:

```
root@kali:~/Java# javac Practical_7.java
root@kali:~/Java# java Practical_7
Enter Line : madam
String is palindrome
root@kali:~/Java# java Practical_7
Enter Line : java
String is not palindrome
root@kali:~/Java#
```

Practical-8:
Create a class which asks the user to enter a sentence, and it should display count of each vowel type in the sentence. The program should continue till user enters a word “quit”. Display the total count of each vowel for all sentences.

Program:

```
import java.util.Scanner;
public class Practical_8
{
	public static void main (String[] args)
	{
		Scanner sc = new Scanner (System.in);
		String str;
		StringBuffer c = new StringBuffer("quit");
		System.out.print("Enter String : ");
		str = sc.nextLine();
		while(!str.contentEquals(c))
		{
			char[] s = new char[str.length()];
			s = str.toCharArray();
			int ca=0,ce=0,ci=0,co=0,cu=0;
			for(int i=0;i<str.length();i++)
			{
				if (s[i]=='a')
					ca++;
				else if (s[i]=='e')
					ce++;
				else if (s[i]=='i')
					ci++;
				else if (s[i]=='o')
					co++;
				else if (s[i]=='u')
					cu++;
			}
			System.out.println("Count of a: "+ca);
			System.out.println("Count of e: "+ce);
			System.out.println("Count of i: "+ci);
			System.out.println("Count of o: "+co);
```

```
                    System.out.println("Count of u: "+cu);
                    System.out.print("Enter String : ");
                    str = sc.nextLine();
                }
            }
}
```

Output:

```
root@kali:~/Java# javac Practical_8.java
root@kali:~/Java# java Practical_8
Enter String : This is Java Programming
Count of a: 3
Count of e: 0
Count of i: 3
Count of o: 1
Count of u: 0
Enter String : Sarvajanik College
Count of a: 3
Count of e: 2
Count of i: 1
Count of o: 1
Count of u: 0
Enter String : quit
root@kali:~/Java#
```

Unit-3: Classes, Objects and Methods

Practical-9:
Write a simple java application that defines a class Student with roll_no(int), name(String),address(String) & branch(String) as data fields. The class should have getData() & showData() methods. The program should create an array of Student object, get the details and display it.

Program:

```
import java.util.Scanner;
class Student
{
	int roll_no;
	String name;
	String address;
	String branch;

	void getdetails()
	{
		Scanner get = new Scanner (System.in);
		System.out.print("Enter Roll No : ");
		roll_no = get.nextInt();
		get.nextLine();
		System.out.print("Enter Name : ");
		name = get.nextLine();
		System.out.print("Enter address : ");
		address = get.nextLine();
		System.out.print("Enter branch : ");
		branch = get.nextLine();
	}

	void display()
	{
		System.out.println("Roll No : "+roll_no);
		System.out.println("Name : "+name);
		System.out.println("Address : "+address);
		System.out.println("Branch : "+branch);
	}
}
```

```
public class Practical_9
{
	public static void main(String[] args)
	{
		Scanner s = new Scanner (System.in);
		int n;
		System.out.print("Enter n : ");
		n = s.nextInt();
		Student[] stu = new Student[n];
		System.out.println("Enter Details\n\n");
		for (int i=0;i<n;i++)
		{
			stu[i] = new Student();
			System.out.println("Student "+(i+1));
			stu[i].getdetails();
			System.out.println();
		}
		System.out.println("\nDetail Output\n");
		for (int i=0;i<n;i++)
		{
			System.out.println("Student "+(i+1));
			stu[i].display();
			System.out.println();
		}
	}
}
```

Output:

```
root@kali:~/Java# javac Practical_9.java
root@kali:~/Java# java Practical_9
Enter n : 1
Enter Details


Student 1
Enter Roll No : 1
Enter Name : jainam
Enter address : katargam
Enter branch : computer


Detail Output

Student 1
Roll No : 1
Name : jainam
Address : katargam
Branch : computer

root@kali:~/Java#
```

Practical-10:
Write a simple java application that defines a class Complex with real(int) and img(int) as data fields, no-argument constructor and parameterized constructor. The class should have overloaded methods to perform addition of two Complex numbers by passing objects as arguments. Demonstrate this keyword in parameterized constructor.

Program:

```
import java.util.Scanner;
class Complex
{
	int real,img;
	Complex()
	{
		real=img=0;
	}

	Complex(int real,int img)
	{
		this.real=real;
		this.img=img;
	}

	Complex add(Complex c2)
	{
		Complex c3=new Complex();
		c3.real=this.real+c2.real;
		c3.img=this.img+c2.img;
		return c3;
	}

	void add(Complex c1,Complex c2)
	{
		c1.real=c1.real+c2.real;
		c1.img=c1.img+c2.img;
	}

	void display()
```

```
	{
		System.out.println(this.real+"+"+this.img+"i");
	}
}

class Practical_10
{
	public static void main(String args[])
	{
		Complex c1=new Complex(3,4);
		Complex c2=new Complex(4,7);
		Complex c3=new Complex();
		System.out.print("c1 = ");
		c1.display();
		System.out.print("c2 = ");
		c2.display();
		c3=c1.add(c2);
		System.out.print("c1 + c2 = ");
		c3.display();
		c3.add(c1,c2);
		System.out.print("c1 + c2 = ");
		c3.display();
	}
}
```

Output:

```
root@kali:~/Java# javac Practical_10.java
root@kali:~/Java# java Practical_10
c1 = 3+4i
c2 = 4+7i
c1 + c2 = 7+11i
c1 + c2 = 7+11i
root@kali:~/Java#
```