1. Write a program to take the starting and ending values for a range of numbers and display the prime numbers in this list.

Sol.

```
import java.util.Scanner;
public class Main {
  //is_prime method returns True if a num is prime
  static boolean is_prime(int num){
    //As <=1 are not Primes
    if(num<=1){
      return false; }
    for(int i = 2; i < num; i++){
      //Checks if num is divisible by any number from 2 to num
      if(num%i == 0){
        // if divisible return False
        return false; }
    } return true; }
  public static void main(String[] args) {
    Scanner myScanner = new Scanner(System.in);
    int start = myScanner.nextInt();
    int destiny = myScanner.nextInt();
    System.out.println("Primes Between "+ start + " and " + destiny +" are :");
    for(int index = start; index < destiny; index++){
      //If Prime ? Displays Primes from Start to Destiny
      if(is_prime(index)){
        System.out.println(index);
      }
    }
  }
}
```

2. Write a program to display the multiplication tables from 1 x 1 to 9 x 9 in a matrix format, highlighting all odd and even numbers in different font colors.

Sol.

```
public class Main{
   public static final String Reset = "\033[0m";//resets the color
   public static final String Blue = "\033[0;34m";//blue color
   public static final String Green = "\033[0;32m";//green color
   public static void main(String[] args){
      for(int i = 1; i <= 9; i++){
         for(int j = 1; j < 10; j++){
            int mul = i * j;
            String Blue_reset = Blue + mul + Reset;
            String Green_reset = Green + mul + Reset;
            System.out.print("\t" + ((mul%2 == 0)? Blue_reset :       Green_reset));
         }
         System.out.println();
      }
   }
}
```

Output:

1	2	3	4	5	6	7	8	9
2	4	6	8	10	12	14	16	18
3	6	9	12	15	18	21	24	27
4	8	12	16	20	24	28	32	36
5	10	15	20	25	30	35	40	45
6	12	18	24	30	36	42	48	54
7	14	21	28	35	42	49	56	63
8	16	24	32	40	48	56	64	72
9	18	27	36	45	54	63	72	81

3. Write a program that prints the value 12345 in a column-width of 10, either right-justified, left-justified or right-justified with padded zeros on left, depending on user's selection

Sol.

```java
import java.util.Scanner;
public class Main{
  public static void main(String[] args){
     Scanner my_scanner = new Scanner(System.in);
     int num = 12345;
    System.out.println("Choose your Selection :" + "\n" + "1. Right-Justified "+ "\n" + "2. Left-Justified" + "\n" + "3. Right-Justified with Padded Zeros on Left ");
    int userInput = my_scanner.nextInt();
    switch(userInput){
       case 1:
         //Right- Justified
         System.out.printf("%-10d", num);
         break;
       case 2:
         //Left- Justified
         System.out.printf("%10d", num);
         break;
       case 3:
         //Right-Justified with Padded Zeros on Left
         System.out.printf("%010d", num);
         break;
    }
  }
}
```

```
Input :
     3
Output :
    Choose your Selection :
    1. Right-Justified
    2. Left-Justified
    3. Right-Justified with Padded Zeros on Left
    0000012345
```

4. Write a program to display the value of pi up to a selected number of decimal places depending on the user's choice.

Sol.

```
import java.util.Scanner;
public class Main{
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    int no_of_dec_places = my_scanner.nextInt();
    System.out.printf("%."+ no_of_dec_places + "f", Math.PI);
  }
}
```

5. Write a Universal converter program that can convert weights, distances and temperatures from one-unit system to another

Sol.

6. Write a program to take radius of circle and calculate Area of a Circle

Sol.

```
import java.util.Scanner;
public class Main{
```

```
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    int radius_of_circle = my_scanner.nextInt();//if inputs 3
    double area_of_circle = Math.PI * Math.pow(radius_of_circle, 2);//πr2
    System.out.printf("%.2f", area_of_circle);//outputs 28.27
  }
}
```

7. Write a program to take the radius of circle and calculate Perimeter Circle.

Sol.

```
import java.util.Scanner;
public class Main{
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    int radius_of_circle = my_scanner.nextInt();//if Input is 3
    double perimeter_of_circle = 2 * Math.PI *radius_of_circle, 2;//2πr
    System.out.printf("%.2f", perimeter_of_circle);//Outputs 18.85
  }
}
```

8. Write a program to accept an array of a specified length (say 15). And then display the Largest and Smallest Number in that Array.

Sol.

```
import java.util.Scanner;
public class Main{
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    int array[] = new int[15];
    for(int index = 0; index < array.length; index++){
      array[index] = my_scanner.nextInt();
    }
```

```
    int largest_in_arr = 0, smallest_in_arr =0;
    for(int i = 0; i < array.length; i++){
      largest_in_arr = array[0];
      smallest_in_arr = array[0];
      for(int j = i; j < array.length; j++){
        if(largest_in_arr < array[j]){
          largest_in_arr = array[j];
        }
        if(smallest_in_arr > array[j]){
          smallest_in_arr = array[j];
        }
      }
    }
    System.out.println("The Largest Number in given Array is " +  largest_in_arr);
    System.out.println("The Smallest Number in given Array is " +smallest_in_arr);
  }
}
```

9. Write a program to take any number and display the Factorial value of the number.

Sol.

```
import java.util.Scanner;
public class Main{
  //returns the factorial of given number
  static int factorial_of_num(int number){
    if(number <= 1){
      return 1;
    }
    else{
      return number * factorial_of_num(number - 1);
    }
  }
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    int num_to_find_fact = my_scanner.nextInt();
```

```
    System.out.println(factorial_of_num(num_to_find_fact));
  }
}
```

10. Write a program to take any number and check if the number is Palindrome or not.

Sol.

```
import java.util.Scanner;
public class Main{
  //returns reverse of a number
  static int reverse_of_num(int num){
    int remainder = 0, reversed_num = 0;
    while(num > 0){
      remainder = num%10;
      reversed_num = reversed_num * 10 + remainder;
      num /= 10;
    }
    return reversed_num;
  }
  //checks palindrome of a given number
  static boolean check_palindrome(int number){
    if(number != reverse_of_num(number)){
      return false;
    }
    return true;
  }
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    int user_input = my_scanner.nextInt();
    if(check_palindrome(user_input)){
      System.out.println(user_input + " is Palindrome.");
    }
    else{
      System.out.println(user_input + " is not a Palindrome");
```

```
    }
  }
}
```

11. Write a program to take a 4-digit number as year and determine if given year is leap year or not.

Sol.

```
import java.util.Scanner;
public class Main{
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    int year = my_scanner.nextInt();
    // leap year if perfectly divisible by 400
    if (year % 400 == 0) {
      System.out.printf("%d is a leap year.", year);
    }
    // not a leap year if divisible by 100
    // but not divisible by 400
    else if (year % 100 == 0) {
      System.out.printf("%d is not a leap year.", year);
    }
    // leap year if not divisible by 100
    // but divisible by 4
    else if (year % 4 == 0) {
      System.out.printf("%d is a leap year.", year);
    }
    // all other years are not leap years
    else {
      System.out.printf("%d is not a leap year.", year);
    }
  }
}
```

12. Write a program to take accept an array of a specified length (say 15) and then Copy the array contents from source array to destination array

Sol.

```
import java.util.Scanner;
public class Main{
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    int src_array[] = new int[15];
    for(int index = 0; index < src_array.length; index++){
      src_array[index] = my_scanner.nextInt();
    }
    int dest_array[] = new int[15];
    for(int dest_index = 0; dest_index < dest_array.length; dest_index++){
      dest_array[dest_index] = src_array[dest_index];
    }
    System.out.println("Destiny array after copying : ");
    for(int i = 0; i < dest_array.length; i++){
      System.out.print(dest_array[i] + " ");
    }
  }
}
```

13. Write a program to take any number and display the number in words. For ex: the number supplied is 123, then it should display one two three

Sol.

```
import java.util.Scanner;
public class Main{
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    String single_digits[] = {"zero", "one", "two", "three",
                              "four", "five", "six", "seven",
                              "eight", "nine"};
                int number = my_scanner.nextInt();
```

```
                int ones_digit = number%10;
                int tens_digit = (number/10)%10;
                int hundredth_digit = (number/100)%10;
                int thousands_digit = (number/1000)%10;
                String number_in_str = Integer.toString(number);
                int number_in_str_len = number_in_str.length();
                if(number_in_str_len == 1){
                   System.out.println(single_digits[ones_digit]);
                }
                else if(number_in_str_len == 2){
                   System.out.println(single_digits[tens_digit] + " " +
single_digits[ones_digit]);
                }
                else if(number_in_str_len == 3){
                   System.out.println(single_digits[hundredth_digit] + " " +
single_digits[tens_digit]+ " "+ single_digits[ones_digit]);
                }
                else if(number_in_str_len == 4){
                   System.out.println(single_digits[thousands_digit] + " " +
single_digits[hundredth_digit] + " " + single_digits[tens_digit]+ " " +
single_digits[ones_digit]);
                }
                else{
                   System.out.printf("This Version cannot accepts %d digit numbers",
number_in_str_len);
                }
   }
}
```

14. Write a program to take any number and display the number in words. For ex: the number supplied is 123, then it should display one hundred twenty three

Sol.

```
import java.util.Scanner;
```

```
public class Main
{
 static String tens_result (int tens, String[]two_digits,
                            String[]tens_multiple, int ones_place,
                            String[]single_digits)
 {
  String result_str = "";
  String print_ones_place = "";
  if (tens != 0)
   {
        if (tens == 1)
         result_str += two_digits[ones_place];
        else
         result_str += tens_multiple[tens] + " ";
   }
  if (ones_place > 0)
   {
        if (tens > 1)
         {
          print_ones_place += single_digits[ones_place];
         }
   }
  else if (ones_place > 0 && tens == 0)
   {
        print_ones_place += single_digits[ones_place];
   }
  else
   {
        print_ones_place = " ";
   }
  result_str += print_ones_place;

  return result_str;
 }

 public static void main (String[]args)
```

```
{
 Scanner my_scanner = new Scanner (System.in);
 String[]single_digits ={
 "Zero", "One", "Two", "Three",
        "Four", "Five", "Six", "Seven", "Eight", "Nine"};

 String[]two_digits ={
 "Ten", "Eleven", "Twelve",
        "Thirteen", "Fourteen", "Fifteen",
        "Sixteen", "Seventeen", "Eighteen", "Nineteen"};

 String[]tens_multiple ={
 "", "", "Twenty", "Thirty", "Forty",
        "Fifty", "Sixty", "Seventy", "Eighty", "Ninety"};

 String[]tens_power ={
 "Hundred", "Thousand"};
 int number = 123;
 int ones_place = number % 10;
 int tens = (number / 10) % 10;
 int hundreds = (number / 100) % 10;
 int thousands = number / 1000;
 String result_str_thousands = "";
 String hundreds_print = "";
 String number_in_str = Integer.toString (number);
 int number_in_str_len = number_in_str.length ();
 if (number_in_str_len == 1)
  System.out.println (single_digits[ones_place]);
 else if (number_in_str_len == 2)
  System.out.println (tens_result
                          (tens, two_digits, tens_multiple, ones_place,
                           single_digits));
 else if (number_in_str_len == 3)
  System.out.println (single_digits[hundreds] + " " + tens_power[0] +
                          " " + tens_result (tens, two_digits, tens_multiple,
                                             ones_place, single_digits));
```

```
  else if (number_in_str_len == 4)
   {
        result_str_thousands +=
         single_digits[thousands] + " " + tens_power[1];
        if (hundreds != 0)
         {
          hundreds_print =
           " " + single_digits[hundreds] + " " + tens_power[0];
          result_str_thousands += hundreds_print;
         }
        else
         {
          result_str_thousands += " ";
         }
        result_str_thousands +=
         " " + tens_result (tens, two_digits, tens_multiple, ones_place,
                            single_digits);
        System.out.println (result_str_thousands);
   }
  else
   {
        System.out.printf
         ("Sorry this version won't support %d digits, You get it in next update.. :-)",
          number_in_str_len);
   }
 }
}
```

15. Write a program to take any number and calculate the sum of all digits of the number and display the sum as a single digit number. For ex: number is 38, then sum should be displayed as 2(3 + 8 =11=>1+1=2)

Sol.

```
import java.util.Scanner;
public class Main{
```

```
  static int sum_of_all_dig(int number){
    int rem_of_num, sum_of_num = 0;
    while(number > 0){
      rem_of_num = number%10;
      sum_of_num += rem_of_num;
      number /= 10;
    }
    return sum_of_num;
  }
  public static void main(String[] args){
    Scanner my_scanner = new Scanner(System.in);
    int number = my_scanner.nextInt();
    int sum_of_num = 0;
    sum_of_num = sum_of_all_dig(number);
    if(sum_of_num > 9){
      System.out.println(sum_of_all_dig(sum_of_num));
    }
    else{
      System.out.println(sum_of_num);
    }
  }
}
```

16. Input a character from the keyboard and find out whether it is a capital letter, small letter, digit or a special symbol.

Sol.

```
import java.util.Scanner;
public class Main {
  public static void main(String[] args) {
    Scanner my_scanner = new Scanner(System.in);
    char inp_char = my_scanner.next().charAt(0);
    if(inp_char > 65 && inp_char <= 90){
      System.out.println(inp_char + " is a Capital Letter");
    }
```

```
    else if(inp_char > 97 && inp_char<= 122){
      System.out.println(inp_char + " is a Small Letter");
    }
    else if(inp_char > 48 && inp_char<= 57){
      System.out.println(inp_char + " is a Digit");
    }
    else{
      System.out.println(inp_char + " is a Character");
    }
  }
}
```

17. Input a character and find out whether the character is vowel or consonant

Sol.

```
import java.util.Scanner;
public class Main {
  public static void main(String[] args) {
    Scanner my_scanner = new Scanner(System.in);
    char inp_char = my_scanner.next().charAt(0);
    if(inp_char == 'a' || inp_char == 'e' || inp_char == 'i' || inp_char == 'o' || inp_char
== 'u' || inp_char == 'A' || inp_char == 'E' || inp_char == 'I' || inp_char == 'O' ||
inp_char =='U'){
      System.out.println(inp_char + " is a Vowel");
    }
    else{
      System.out.println(inp_char + " is a Consonant");
    }
  }
}
```

18. Write a program to read in numbers until the number -999 is encountered. The sum of all number read until this point should be printed out

Sol.

```
import java.util.Scanner;
public class until_a_no_enc {
            public static void main(String[] args) {
                        Scanner my_scanner = new Scanner(System.in);
              int inp_num, sum_of_num =  0;
         while((inp_num = my_scanner.nextInt()) != -999){
                sum_of_num += inp_num;
              }
              System.out.println(sum_of_num);
            }
}
```

19. Write a program to read in 10 numbers and compute the sum, average, maximum, second maximum and minimum values.

Sol.

```
import java.util.*;
public class num_max_min_med_of_arr {
  public static void main(String[] args) {
            Scanner my_scanner = new Scanner(System.in);
            int inp_arr[] = new int[10];
            int arr_index = 0;
            for(int index = 0; index < inp_arr.length; index++) {
                        int arr_value = my_scanner.nextInt();
                        inp_arr[arr_index++] = arr_value;
            }
     int len_of_arr = inp_arr.length;
            for(int iter_ele = 0; iter_ele < inp_arr.length - 1; iter_ele++) {
                        int min = iter_ele;
                        for(int inp_arr_index = iter_ele + 1; inp_arr_index < inp_arr.length;
inp_arr_index++) {
                                    if(inp_arr[inp_arr_index] < inp_arr[min]) {
                                                min = inp_arr_index;
                                    }
                          int temp = inp_arr[min];
                          inp_arr[min] = inp_arr[iter_ele];
```

```
                    inp_arr[iter_ele] = temp;
                }
            }
            int sum_of_arr_ele = 0;
            for(int iter_ele = 1; iter_ele < len_of_arr; iter_ele++) {
                sum_of_arr_ele += inp_arr[iter_ele];
            }
            float inp_arr_avg = sum_of_arr_ele /10;
            System.out.print("Max of Array: " + inp_arr[len_of_arr-1] +  "\nMin of Array: " +
inp_arr[0] + "\nSecond Max of Array " + inp_arr[len_of_arr-2] + "\nSecond Min of
Array: " + inp_arr[1] + "\nSum of Array Elements: " + sum_of_arr_ele + "\nArray
Average: " + inp_arr_avg);
    }
}
```

20. Write a program to read 10 numbers and compute the sum of even numbers and sum of odd numbers.

Sol.

```
import java.util.*;
public class even_odd_sum_of_arr {
        public static void main(String[] args) {
                Scanner my_scanner = new Scanner(System.in);
                int inp_arr[] = new int[10];
                for(int index = 0; index < 10; index++) {
                        int arr_ele = my_scanner.nextInt();
                        inp_arr[index] = arr_ele;
                }
                int even_sum = 0, odd_sum = 0;
                for(int index = 0; index < 10; index++) {
                        if(inp_arr[index] %2 == 0) {
                                even_sum += inp_arr[index];
                        }
                        else {
                                odd_sum += inp_arr[index];
                        }
```

```
                }
                System.out.println("Even Sum: "+ even_sum + " Odd Sum: " + odd_sum);
        }
}
```

21. Write a program to find whether a given number is Strong or not. Note: Strong number is a special number whose sum of factorial of digits is equal to the original number. For example: 145 is a strong number. Since, 1! + 4! + 5!

Sol

```
import java.util.*;
public class strong_or_not {
  static int factorial(int num) {
        if (num <=1) {
                return 1;
        }
        else {
                return num*factorial(num - 1);
        }
  }
  public static void main(String[] args) {
        Scanner my_scanner = new Scanner(System.in);
        int inp_num = my_scanner.nextInt();
        int  sum_of_dig = 0;
        int inp_num_temp = inp_num;
        while(inp_num > 0) {
                int temp = inp_num % 10;
                sum_of_dig += factorial(temp);
                inp_num /= 10;
        }
        System.out.println((sum_of_dig == inp_num_temp) ? inp_num_temp+" is
Strong" : inp_num_temp+" is not Strong");
  }
}
```

22. Ask the user for their birthday. It will probably be easiest to ask year, then month, then day rather than parsing a combined string reliably.

a. Calculate the age of the user. Check to see if the age of the user is impossible. For example, if the user is not yet born, or age is greater than 100, display an error message.

b. Output the age of the user to the console.

c. And if the entered user month and date matches the current system date, then display a birthday message to the user on console.

Sol.

```
import java.util.*;
import java.text.DateFormat;
import java.text.SimpleDateFormat;
import java.util.Date;

public class age_wishes_of_user {
	public static void main(String[] args) {
		DateFormat get_date = new SimpleDateFormat("yyyy/MM/dd");
		Date date = new Date();
		String curr_date = get_date.format(date);
		Scanner my_scanner = new Scanner(System.in);
		System.out.println("Enter Your Date Of Birth: ");
		System.out.print("Your Born Year : ");
		int year = my_scanner.nextInt();
		System.out.print("Your Born Month : ");
		int month = my_scanner.nextInt();
		System.out.print("Your Born Day : ");
		String day = my_scanner.next();
		if ((month > 0 && month <= 12) && (Integer.parseInt(day) > 0 &&
Integer.parseInt(day) <= 31)) {
			String str_mon = (month < 10) ? ("0" +
String.valueOf(month)) : String.valueOf(month);
```

```
                        String user_dob = year + "/" + str_mon + "/" + day;
                        String date_split[] = curr_date.split("/");
                        String curr_year = date_split[0];
                        String curr_month = date_split[1];
                        String curr_day = date_split[2];
                        int user_age = Integer.parseInt(curr_year) - year;
                        int user_age_mon = (Integer.parseInt(str_mon) >
Integer.parseInt(curr_month))
                                        ? Integer.parseInt(str_mon) -
Integer.parseInt(curr_month)
                                        : Integer.parseInt(curr_month) -
Integer.parseInt(str_mon);
                        String msg = ((user_age > 1) ? (user_age + " Years and ") :
(user_age + " Year and "))
                                        .concat((user_age_mon > 1) ?
(user_age_mon + " Months Old") : (user_age_mon + " Month Old"));
                        if (curr_date.equals(user_dob)) {
                                System.out.println("Welcome to the World..! Little
One =)");
                        } else if ((curr_month.equals(str_mon) &&
curr_day.equals(day)) && (user_age < 100 && user_age > 0)) {
                                System.out.println("Happy Birthday Beautiful..!!! :-)"
+ " You are " + msg);
                        } else if (year == 0 || month == 0 || Integer.parseInt(day)
== 0 || user_age < 0) {
                                System.out.println("Error User Not yet Born");
                        } else if (user_age > 100 || user_age < 0) {
                                System.out.printf("Error user is too old enough %d
years, You r centenarian.. /_\\", user_age);
                        } else {
                                System.out.println("You are " + msg);
                        }
                } else {
```

```
                    System.out.println("Error, Something gone wrong!!! Try
Again");
                }
        }
}
```