FUNCTIONS & METHODS

1. Binary to Decimal Conversion

```java
public class binarytodecimal {

    public static void binToDec (int binNum) {
        int myNum = binNum;
        int pow = 0;
        int decNum = 0;

        while (binNum > 0) {
            int lastDigit = binNum % 10;
            decNum = decNum + (lastDigit * (int) Math.pow(2, pow));
            pow ++;

            binNum = binNum / 10;
        }
        System.out.println("Decimal of " + myNum + " = " + decNum);
    }

    public static void main(String[] args) {

        binToDec(101001);
    }
}
```

2. Binomial Coefficient

```java
import java.util.Scanner;

public class combination {

    public static int factorial(int num) {
        int fact = 1;
        for (int i = 1; i <= num; i++) {
            fact *= i;
        }
        return fact;
    }

    public static int bincoef(int n, int r) {
        int n_fact = factorial(n);
        int r_fact = factorial(r);
        int nr_fact = factorial(n-r);
        int bincoef = n_fact / (r_fact * nr_fact);
        return bincoef;
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner (System.in);
        System.out.print("Enter value of n: ");
        int n = sc.nextInt();
        System.out.print("Enter value of r: ");
        int r = sc.nextInt();
        int bc = bincoef(n, r);
        System.out.println("Binomial Coefficient is: " + bc);
    }
}
```

3. Decimal to Binary Conversion

```java
public class decimalToBinary {

    public static void decToBin (int n) {

        int myNum = n;
        int pow = 0;
        int binNum = 0;

        while (n > 0) {
            int rem = n % 2;
            binNum = binNum + (rem * (int) Math.pow(10, pow));
            pow++;
            n = n / 2;
        }
        System.out.println("Binary form of " + myNum + " = " + binNum);
    }

    public static void main(String[] args) {
        decToBin(19);
    }
}
```

4. Factorial

```java
import java.util.Scanner;

public class factorial {

    public static int factorial(int num) {
        int fact = 1;
        for (int i = 1; i <= num; i++) {
            fact *= i;
        }
        return fact;
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner (System.in);
        System.out.print("Enter Number: ");
        int n = sc.nextInt();
        int f = factorial(n);
        System.out.println("Factorial is: " + f);
    }
}
```

5. Hello World Program

```java
public class helloworld {
    public static void printhelloworld() {
        System.out.println("Hello World");
        System.out.println("Hello World");
        System.out.println("Hello World");
        System.out.println("Hello World");
        System.out.println("Hello World");
        // void has not any return type
    }
    public static void main(String[] args) {
        printhelloworld();
    }
}
```

6. Function Overloading

```java
public class overloading {
    // Function overloading using different no. of parameters.
    public static int sum (int a, int b) {
        return a + b;
    }
    public static int sum (int a, int b, int c) {
        return a + b + c;
    }
    // Function overloading using different data types of parameters.
    public static int multiply (int a, int b) {
        return a * b;
    }
    public static float multiply (float a, float b) {
        return a * b;
    }
    public static void main(String[] args) {
        System.out.println("Addition: ");
        System.out.println(sum(10, 2));
        System.out.println(sum(5, 10, 2));
        System.out.println("Multiplication: ");
        System.out.println(multiply(20, 2));
        System.out.println(multiply(2.2f, 1.1f));
    }
}
```

7. Check Prime or Not

```java
public class prime {
    public static boolean isPrime(int n) {
        for (int i=2; i <= Math.sqrt(n); i++) {
            if(n % i == 0) {
                return false;
            }
        }
        return true;
    }
    public static void main(String[] args) {
        System.out.println(isPrime(199));
    }
}
```

8. Prime or Not

```java
public class primeornot {
    public static boolean prime (int n) {
        boolean isPrime = true;
        for (int i = 2; i <= n-1; i++) {
            if (n % i == 0) {
                isPrime = false;
            }
        }
        return isPrime;
    }
    public static void main(String[] args) {
        // True = Number is Prime number.
        // False = Number is Composite number.
        System.out.print(prime(7));
    }
}
```

9. Prime Number in Range

```java
public class primeinRange {

    public static boolean isPrime(int n) {
        for (int i=2; i <= Math.sqrt(n); i++) {
            if(n % i == 0) {
                return false;
            }
        }
        return true;
    }

    public static void inRange(int n) {
        for (int i = 2; i <= n; i++) {
            if (isPrime(i)) { //true
                System.out.print(i+ " ");
            }
        }
        System.out.println();
    }

    public static void main(String[] args) {
        inRange(20); // Print prime no. from 2 to 20
    }
}
```

10. Multiplication of two Number

```java
import java.util.Scanner;

public class product {

    public static int multiplication(int a, int b) {
        int multiply = a * b;
        return multiply;
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner (System.in);
        System.out.print("Enter value of a: ");
        int num1 = sc.nextInt();
        System.out.print("Enter value of b: ");
        int num2 = sc.nextInt();
        int mul = multiplication(num1, num2);
        System.out.println("Multiplication of a and b: " + mul);
    }
}
```

11. Average of 3 Numbers

```java
public class que1 {
    public static void average (int a, int b, int c) {
        int average = (a + b + c) / 3;
        System.out.println(average);
    }
    public static void main(String[] args) {
        average(5, 5, 5);
    }
}
```

12. Evern or Odd

```java
import java.util.Scanner;

public class que2 {

    public static boolean isEven (int n) {

        if (n % 2 == 0) {
            return true;
        }
        else {
            return false;
        }

    }

    public static void main(String[] args) {
        Scanner sc = new Scanner (System.in);

        System.out.print("Enter Number: ");
        int num = sc.nextInt();

        if (isEven(num)) {
            System.out.println("Number is Even");
        } else {
            System.out.println("Number is Odd");
        }
    }
}
```

13. Palindrome or Not

```java
import java.util.Scanner;

public class que3 {

    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Number : ");
        int palindrome = sc.nextInt();
        if (isPalindrome(palindrome)) {
            System.out.println("Number : " + palindrome + " is a palindrome");
        } else {
            System.out.println("Number : " + palindrome + " is not a palindrome");
        }
    }

    public static boolean isPalindrome(int number) {
        int palindrome = number; // copied number into variable
        int reverse = 0;
        while (palindrome != 0) {
            int remainder = palindrome % 10;
            reverse = reverse * 10 + remainder;
            palindrome = palindrome / 10;
        }
        if (number == reverse) {
            return true;
        }
        return false;
    }
}
```

14. Maths Function in JAVA

```java
public class que4 {
    public static void main(String[] args) {
        double a = -10;
        double b = 5;

        System.out.println("Maximum of a and b is: " + Math.max(a, b));
        System.out.println("Minimum of a and b is: " + Math.min(a, b));
        System.out.println("Square root of is: " + Math.sqrt(a));
        System.out.println("a to the Power of b is: " + Math.pow(a, b));
        System.out.println("Maximum of a and b is: " + Math.abs(a));
    }
}
```

15. Sum of Digits

```java
import java.util.Scanner;

public class que5 {

    public static int isSum (int num) {
        int sum = 0;
        while (num > 0) {
            int lastDigit = num % 10;
            sum = sum + lastDigit;
            num = num / 10;
        }
        return sum;
    }
    public static void main(String[] args) {

        Scanner sc = new Scanner (System.in);
        System.out.print("Enter an Integer: ");
        int n = sc.nextInt();
        System.out.println("Sum of Digits is: " + isSum(n));
    }
}
```

16. Sum of 2 Numbers

```java
import java.util.Scanner;
public class sumoftwo {
    // int num1, int num2 are parameters or formal parameters
    public static int calculatesum(int num1, int num2) {
        int sum = num1 + num2;
        return sum;
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner (System.in);
        System.out.print("Enter num1: ");
        int a = sc.nextInt();
        System.out.print("Enter num2: ");
        int b = sc.nextInt();
        // (a, b) a and b are arguments or actual parameters
        int sum = calculatesum(a, b);
        System.out.println("Sum is: " + sum);
    }
}
```

17. Swapping of Numbers

```java
import java.util.Scanner;

public class swap {

    public static void swapping(int a, int b) {
        //swapping
        int temp = a;
        a = b;
        b = temp;
        System.out.println("After Swapping: ");
        System.out.println("Value of a: " + a);
        System.out.println("Value of b: " + b);
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner (System.in);
        System.out.print("Enter value of a: ");
        int a = sc.nextInt();
        System.out.print("Enter value of b: ");
        int b = sc.nextInt();
        swapping(a, b);

        // we cannot print output in the main() becoz whatever we change inside the user defined function it is only changed in this function only if we come out or go to main function value remains in it actual value that is also called CALL BY VALUE
    }
}
```