

Ex.No.1

Basic Java Programming

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1. Find GCD of Two Numbers

GCD.java

```
import java.util.Scanner;

public class GCD {

    static int findGCD(int n1, int n2) {
        while (n1 != n2) {
            if(n1 > n2) {
                n1 -= n2;
            } else {
                n2 -= n1;
            }
        }
        return n1;
    }

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter first number: ");
        int num1 = input.nextInt();
        System.out.print("Enter second number: ");
        int num2 = input.nextInt();
        num1 = (num1 > 0) ? num1 : -num1;
        num2 = (num2 > 0) ? num2 : -num2;
        System.out.println("GCD of " + num1 + " and " + num2 + " is " + findGCD(num1, num2));
    }
}
```

Output:

```
/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/3
Enter first number: 20
Enter second number: 28
GCD of 20 and 28 is 4

Process finished with exit code 0
```

2. Find LCM of Two Numbers

LCM.java

```
import java.util.Scanner;

public class LCM {

    static int findLCM(int n1, int n2) {
        int lcm = Math.max(n1, n2);
        while(true) {
            if (lcm % n1 == 0 && lcm % n2 == 0) {
                return lcm;
            }
        }
    }
}
```

```

        ++lcm;
    }
}

public static void main(String[] args) {
    Scanner input = new Scanner(System.in);
    System.out.print("Enter first number: ");
    int num1 = input.nextInt();
    System.out.print("Enter second number: ");
    int num2 = input.nextInt();
    System.out.println("LCM of " + num1 + " and " + num2 + " is " + findLCM(num1, num2));
}
}

```

Output:

```

/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
Enter first number: 96
Enter second number: 54
LCM of 96 and 54 is 864
Process finished with exit code 0

```

3. Display characters from A to Z using loop

DisplayAlpha.java

```

public class DisplayAlpha {
    public static void main(String[] args) {
        char alphabet;
        for(alphabet = 'A'; alphabet <= 'Z'; ++alphabet) {
            System.out.print(alphabet + " ");
        }
    }
}

```

Output:

```

/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Process finished with exit code 0

```

4. Count Number of Digits in an Integer

NumOfDigits.java

```

import java.util.Scanner;

public class NumOfDigits {
    static int countDigits(int n) {
        String num = Integer.toString(n);
        return num.length();
    }
}

```

```

public static void main(String[] args) {
    Scanner input = new Scanner(System.in);
    System.out.print("Enter the number: ");
    int number = input.nextInt();
    System.out.println("The Number of digits in " + number + " is " + countDigits(number));
}
}

```

Output:

```

/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
Enter the number: 123441243
The Number of digits in 123441243 is 9

Process finished with exit code 0

```

5. Reverse a Number

ReverseNum.java

```

import java.util.Scanner;
public class ReverseNum {
    static int reverseNumber(int n) {
        int reversed = 0;
        while (n != 0) {
            int digit = n % 10;
            reversed = reversed * 10 + digit;
            n /= 10;
        }
        return reversed;
    }
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a number to be reversed: ");
        int num = input.nextInt();
        System.out.println("Reversed Number = " + reverseNumber(num));
    }
}

```

Output:

```

/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
Enter a number to be reversed: 123456
Reversed Number = 654321

Process finished with exit code 0

```

6. Calculate the Power of a Number

NumberPower.java

```
import java.util.Scanner;

public class NumberPower {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the number: ");
        int num = input.nextInt();
        System.out.print("Enter the power: ");
        int exponent = input.nextInt();
        double result = Math.pow(num, exponent);
        System.out.println(num + " to the power of " + exponent + " = " + result);
    }
}
```

Output:

```
/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/3
Enter the number: 2
Enter the power: 3
2 to the power of 3 = 8.0
Process finished with exit code 0
```

7. Display Factors of a Number

Factors.java

```
import java.util.Scanner;

public class Factors {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = input.nextInt();
        System.out.print("The Factors of " + num + " = ");
        for(int i = 1; i <= num; ++i) {
            if(num % i == 0) {
                System.out.print(i + " ");
            }
        }
    }
}
```

Output:

```
/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/3
Enter a number: 56
The Factors of 56 = 1 2 4 7 8 14 28 56
Process finished with exit code 0
```

8. Make a Simple Calculator using switch...case

Calculator.java

```
import java.util.Scanner;

public class Calculator {

    static double add(double a, double b) {
        return a + b;
    }

    static double sub(double a, double b) {
        return a - b;
    }

    static double mul(double a, double b) {
        return a * b;
    }

    static double div(double a, double b) {
        return a / b;
    }

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Choose a operation to perform");
        System.out.println("1 - Addition\n2 - Subtraction\n3 - Multiplication\n4 - Division");
        System.out.print("Your choice: ");
        int choice = input.nextInt();
        System.out.print("Enter first number: ");
        double num1 = input.nextDouble();
        System.out.print("Enter second number: ");
        double num2 = input.nextDouble();
        String result = "";
        switch (choice) {
            case 1: result = num1 + " + " + num2 + " = " + add(num1, num2); break;
            case 2: result = num1 + " - " + num2 + " = " + sub(num1, num2); break;
            case 3: result = num1 + " * " + num2 + " = " + mul(num1, num2); break;
            case 4: result = num1 + " / " + num2 + " = " + div(num1, num2); break;
            default:
                System.out.println("Wrong Choice");
        }
        System.out.println(result);
    }
}
```

Output:

```
/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/...
Choose a operation to perform
1 - Addition
2 - Subtraction
3 - Multiplication
4 - Division
Your choice: 3
Enter first number: 2
Enter second number: 3
2.0 * 3.0 = 6.0
Process finished with exit code 0
```

9. Convert Binary to Decimal and vice-versa

BinaryDecimal.java

```
import java.util.Scanner;

public class BinaryDecimal {

    static long binaryToDecimal(long n) {
        int decimalNumber = 0, i = 0;
        long rem;
        while (n != 0) {
            rem = n % 10;
            n /= 10;
            decimalNumber += rem * Math.pow(2, i);
            ++i;
        }
        return decimalNumber;
    }

    static long decimalToBinary(int n) {
        long binaryNumber = 0;
        int rem, i = 1;
        while(n != 0) {
            rem = n % 2;
            n /= 2;
            binaryNumber += rem * i;
            i *= 10;
        }
        return binaryNumber;
    }

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("1 - Binary to Decimal conversion\n2 - Decimal to Binary conversion");
        System.out.print("Choose an Option: ");
        int choice = input.nextInt();
        String result = "";
        switch (choice) {
            case 1:
                // Binary to Decimal conversion
                long n = input.nextLong();
                long decimalNumber = binaryToDecimal(n);
                result = "Binary to Decimal conversion: " + decimalNumber;
                break;
            case 2:
                // Decimal to Binary conversion
                int m = input.nextInt();
                long binaryNumber = decimalToBinary(m);
                result = "Decimal to Binary conversion: " + binaryNumber;
                break;
        }
        System.out.println(result);
    }
}
```

```

        System.out.print("Enter the binary number: ");
        long bin = input.nextLong();
        result = bin + " in binary = " + binaryToDecimal(bin) + " in decimal";
        break;
    case 2:
        System.out.print("Enter the decimal number: ");
        int dec = input.nextInt();
        result = dec + " in decimal = " + decimalToBinary(dec) + " in binary";
        break;
    default:
        System.out.println("Wrong Choice");
    }
    System.out.println(result);
}
}

```

Output:

```

/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
1 - Binary to Decimal conversion
2 - Decimal to Binary conversion
Choose an Option: 1
Enter the binary number: 110110111
110110111 in binary = 439 in decimal

Process finished with exit code 0
/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
1 - Binary to Decimal conversion
2 - Decimal to Binary conversion
Choose an Option: 2
Enter the decimal number: 439
439 in decimal = 110110111 in binary

Process finished with exit code 0

```

10. Convert Octal to Decimal and vice-versa

DecimalOctal.java

```

import java.util.Scanner;

public class DecimalOctal {

    static int decimalToOctal(int n) {
        int octalNumber = 0, i = 1;
        while (n != 0) {
            octalNumber += (n % 8) * i;
            n /= 8;
            i *= 10;
        }
        return octalNumber;
    }

    static long octalToDecimal(int n) {
        int decimalNumber = 0, i = 0;
        while(n != 0) {
            decimalNumber += (n % 10) * Math.pow(8, i);

```



```

        ++i;
        n /= 10;
    }
    return decimalNumber;
}

public static void main(String[] args) {
    Scanner input = new Scanner(System.in);
    System.out.println("1 - Decimal to Octal conversion\n2 - Octal to Decimal conversion");
    System.out.print("Choose an Option: ");
    int choice = input.nextInt();
    String result = "";
    switch (choice) {
        case 1:
            System.out.print("Enter the decimal number: ");
            int dec = input.nextInt();
            result = dec + " in decimal = " + decimalToOctal(dec) + " in octal";
            break;
        case 2:
            System.out.print("Enter the octal number: ");
            int oct = input.nextInt();
            result = oct + " in octal = " + octalToDecimal(oct) + " in decimal";
            break;
        default:
            System.out.println("Wrong Choice");
    }
    System.out.println(result);
}
}

```

Output:

```

/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
1 - Decimal to Octal conversion
2 - Octal to Decimal conversion
Choose an Option: 1
Enter the decimal number: 90
90 in decimal = 132 in octal

Process finished with exit code 0

```

```

/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
1 - Decimal to Octal conversion
2 - Octal to Decimal conversion
Choose an Option: 2
Enter the octal number: 132
132 in octal = 90 in decimal

Process finished with exit code 0

```

11. Convert Binary to Octal and vice-versa

BinaryOctal.java

```
import java.util.Scanner;

public class BinaryOctal {

    static int binaryToOctal(long binaryNumber) {
        int octalNumber = 0, decimalNumber = 0, i = 0;
        while (binaryNumber != 0) {
            decimalNumber += (binaryNumber % 10) * Math.pow(2, i);
            ++i;
            binaryNumber /= 10;
        }
        i = 1;
        while (decimalNumber != 0) {
            octalNumber += (decimalNumber % 8) * i;
            decimalNumber /= 8;
            i *= 10;
        }
        return octalNumber;
    }

    static long octalToBinary(int octalNumber) {
        int decimalNumber = 0, i = 0;
        long binaryNumber = 0;
        while (octalNumber != 0) {
            decimalNumber += (octalNumber % 10) * Math.pow(8, i);
            ++i;
            octalNumber /= 10;
        }
        i = 1;
        while (decimalNumber != 0) {
            binaryNumber += (decimalNumber % 2) * i;
            decimalNumber /= 2;
            i *= 10;
        }
        return binaryNumber;
    }

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("1 - Binary to Octal conversion\n2 - Octal to Binary conversion");
        System.out.print("Choose an Option: ");
        int choice = input.nextInt();
        String result = "";
        switch (choice) {
            case 1:
```

```

        System.out.print("Enter the binary number: ");
        long bin = input.nextLong();
        result = bin + " in binary = " + binaryToOctal(bin) + " in octal";
        break;
    case 2:
        System.out.print("Enter the octal number: ");
        int oct = input.nextInt();
        result = oct + " in octal = " + octalToBinary(oct) + " in binary";
        break;
    default:
        System.out.println("Wrong Choice");
    }
    System.out.println(result);
}
}
}

```

Output:

```

/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
1 - Binary to Octal conversion
2 - Octal to Binary conversion
Choose an Option: 1
Enter the binary number: 10011100
10011100 in binary = 234 in octal

Process finished with exit code 0

```

```

/Library/Java/JavaVirtualMachines/openjdk-14.0.2.jdk/Contents/Home/bin/java -javaagent:/Users/mugilan-codes/Library/Application Support/
1 - Binary to Octal conversion
2 - Octal to Binary conversion
Choose an Option: 2
Enter the octal number: 234
234 in octal = 10011100 in binary

Process finished with exit code 0

```

Source Code:

<https://github.com/Mugilan-Codes/java-lab-exercises>