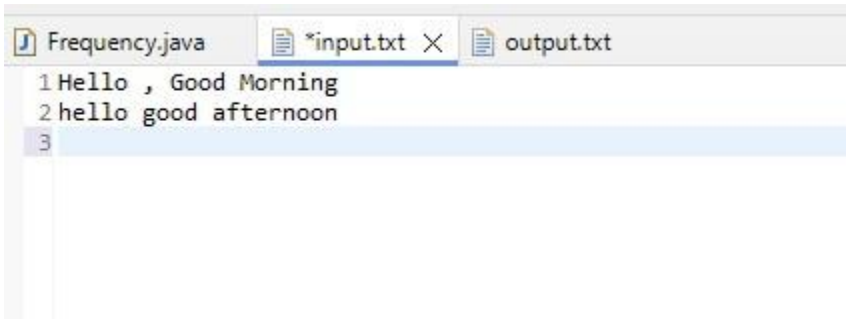
DAY - 20

1] Task 1: Java IO Basics
Write a program that reads a text file and counts the frequency of each word using FileReader and FileWriter.

Solution:-
Txt files -
Input.txt



Code -

Frequency.java | input.txt | output.txt

```java
    public static void main(String[] args) {
            String inputFilePath = "D:\\wipro\\java fullstack\\java full stack\\Eclipse programs class\\DataStructure\\src\\com\\assignment\\inp
            String outputFilePath = "D:\\wipro\\java fullstack\\java full stack\\Eclipse programs class\\DataStructure\\src\\com\\assignment\\ou

            Map<String, Integer> wordFreqMap = new HashMap<>();

            try (BufferedReader reader = new BufferedReader(new FileReader(inputFilePath))) {
                String line;
                while ((line = reader.readLine()) != null) {
                    String[] words = line.split("\\s+");
                    for (String word : words) {
                        word = word.toLowerCase();
                        wordFreqMap.put(word, wordFreqMap.getOrDefault(word, 0) + 1);
                    }
                }
            } catch (IOException e) {
                System.err.println("Error reading the input file: " + e.getMessage());
                return;
            }

            try (FileWriter writer = new FileWriter(outputFilePath)) {
                for (Map.Entry<String, Integer> entry : wordFreqMap.entrySet()) {
                    writer.write(entry.getKey() + ": " + entry.getValue() + "\n");
                }
                System.out.println("Word frequencies written to " + outputFilePath);
            } catch (IOException e) {
                System.err.println("Error writing to the output file: " + e.getMessage());
            }
        }
    }
```

Output -

Console

```
<terminated> Frequency [Java Application] C:\Program Files\Java\jdk-17.0.1\bin\javaw.exe  (03-Jun-2024, 1:42:13 am – 1:42:13 am) [pid: 5812]
Word frequencies written to D:\wipro\java fullstack\java full stack\Eclipse programs class\DataStructure\src\com\assignment\output.txt
```

Output.txt -

Frequency.java | *input.txt | output.txt

```
afternoon: 1
hello: 2
,: 1
good: 2
morning: 1

```

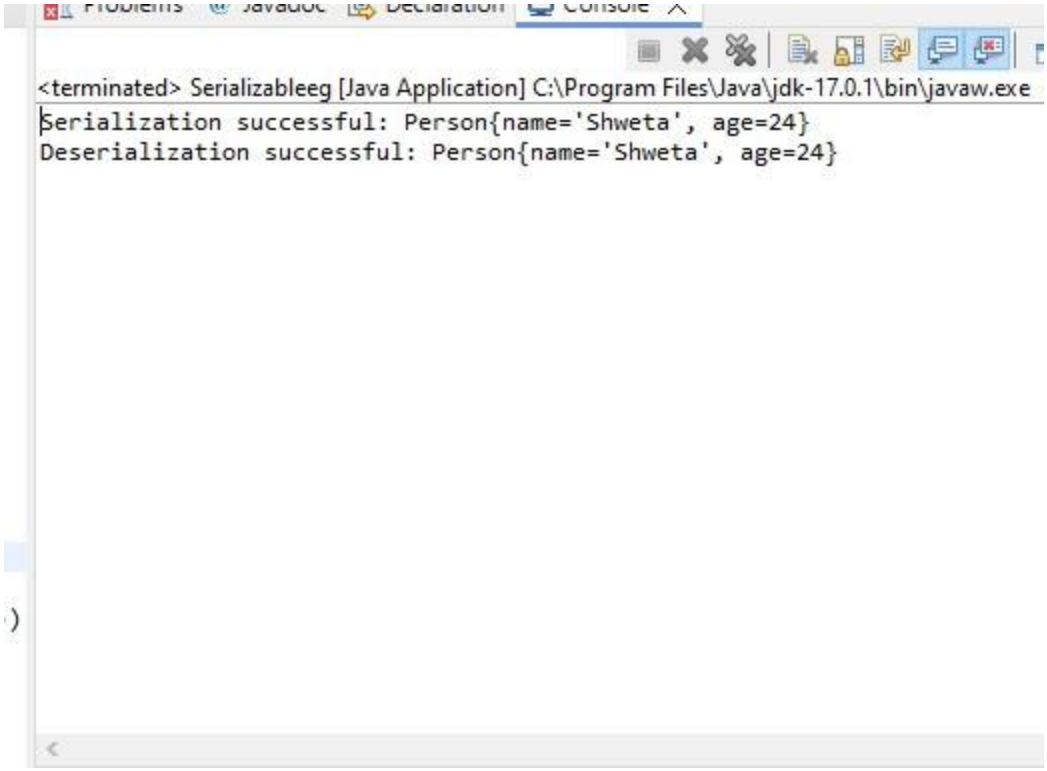
2] Task 2: Serialization and Deserialization
Serialize a custom object to a file and then deserialize it back to recover the object state.

Solution:-
Code -

```java
package com.assignment;


    import java.io.*;


    class Person implements Serializable {
        private static final long serialVersionUID = 1L;
        private String name;
        private int age;

        public Person(String name, int age) {
            this.name = name;
            this.age = age;
        }

        @Override
        public String toString() {
            return "Person{name='" + name + "', age=" + age + "}";
        }


        public String getName() {
            return name;
        }

        public void setName(String name) {
            this.name = name;
        }

        public int getAge() {
            return age;
        }

        public void setAge(int age) {
            this.age = age;
        }
    }
```

```
27        public void setName(String name) {
28            this.name = name;
29        }
30
31        public int getAge() {
32            return age;
33        }
34
35        public void setAge(int age) {
36            this.age = age;
37        }
38    }
39
40    public class Serializableeg {
41        public static void main(String[] args) {
42            String filename = "person.ser";
43
44
45            Person person = new Person("Shweta", 24);
46            try (ObjectOutputStream oos = new ObjectOutputStream(new FileOutputStream(filename))) {
47                oos.writeObject(person);
48                System.out.println("Serialization successful: " + person);
49            } catch (IOException e) {
50                System.err.println("Serialization error: " + e.getMessage());
51            }
52
53
54            try (ObjectInputStream ois = new ObjectInputStream(new FileInputStream(filename))) {
55                Person deserializedPerson = (Person) ois.readObject();
56                System.out.println("Deserialization successful: " + deserializedPerson);
57            } catch (IOException | ClassNotFoundException e) {
58                System.err.println("Deserialization error: " + e.getMessage());
59            }
60        }
61    }
62
63
```

Output -



3] Task 3: New IO (NIO)
Use NIO Channels and Buffers to read content from a file and write to another file.

Solution:-
Code -

```java
package com.wipro;


import java.io.IOException;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.Paths;
import java.nio.file.StandardOpenOption;
import java.util.Iterator;
import java.util.List;

public class Mynio {
    String fileName = "mydir/rhymes.txt";
    public void createDirectory() {
        Path p = Paths.get("mydir");
        try {
            if (Files.exists(p)) {
                System.out.println("Directory already exists");
            } else {
                Path cPath = Files.createDirectories(p);
                System.out.println("Directory created at " + cPath.toString());
            }
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
    public void createFile(String fileName) {
        Path f = Paths.get(fileName);
        try {
            if (Files.exists(f)) {
                System.out.println("File already exists");
            } else {
                Path cFile = Files.createFile(f);
                System.out.println("Directory created at " + cFile.toString());
            }
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
```

```java
                System.out.println("Directory created at " + cFile.toString());
            }
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
    public void readFile() {
        Path f = Paths.get(fileName);
        try {
            List<String> data = Files.readAllLines(f);
            for (String str : data) {
                System.out.println(str);
            }
        } catch (Exception e) {
            e.printStackTrace();
        }

    }
    public void writeFile(String fileName) {
        Path f = Paths.get(fileName);
        try {
            String content = " Johny Johny , Yes Papa,\n Eating sugar ? No Papa";
            Files.write(f, content.getBytes());
            System.out.println("Data Written Successfully");
        } catch (IOException e) {
            // TODO Auto-generated catch block
            e.printStackTrace();
        }
    }

    public void appendFile(String fileName) {
        Path f = Paths.get(fileName);
        try {
            String content = "\n Telling Lies ? No Papa,\n Open your Mouth, Ha Ha Ha :)";
            Files.write(f, content.getBytes(), StandardOpenOption.APPEND);
            System.out.println("Data Appended Successfully");
        } catch (IOException e) {
            // TODO Auto-generated catch block
            e.printStackTrace();
```

```
    }

    public void appendFile(String fileName) {
        Path f = Paths.get(fileName);
        try {
            String content = "\n Telling Lies ? No Papa,\n Open your Mouth, Ha Ha Ha :)";
            Files.write(f, content.getBytes(), StandardOpenOption.APPEND);
            System.out.println("Data Appended Successfully");
        } catch (IOException e) {
            // TODO Auto-generated catch block
            e.printStackTrace();
        }
    }

    public static void main(String[] args) {
        Mynio mn = new Mynio();

        // Create a directory
        mn.createDirectory();

        // Create a file
        mn.createFile("mydir/rhymes.txt");

        // Read from file
        mn.readFile();
        // Write to a file
        mn.writeFile(mn.fileName);

        // Read from file
        mn.readFile();

        // Append to a file
        mn.appendFile(mn.fileName);
        // Read from file
        mn.readFile();
    }

}

```

Output -

```
<terminated> Mynio [Java Application] C:\Program Files\Java\jdk-17.0.1\bin\javaw.exe
Directory already exists
File already exists
 Johny Johny , Yes Papa,
 Eating sugar ? No Papa
 Telling Lies ? No Papa,
 Open your Mouth, Ha Ha Ha :)
Data Written Successfully
 Johny Johny , Yes Papa,
 Eating sugar ? No Papa
Data Appended Successfully
 Johny Johny , Yes Papa,
 Eating sugar ? No Papa
 Telling Lies ? No Papa,
 Open your Mouth, Ha Ha Ha :)
```

4] Task 4: Java Networking

Write a simple HTTP client that connects to a URL, sends a request, and displays the response headers and body.

Solution:-

Code -

```java
package com.assignment;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
import java.net.HttpURLConnection;
import java.net.URL;
import java.util.List;
import java.util.Map;

public class Networking {

public static void main(String[] args) {
            String urlString = "https://github.com/";

            try {

                URL url = new URL(urlString);


                HttpURLConnection connection = (HttpURLConnection) url.openConnection();


                connection.setRequestMethod("GET");


                Map<String, List<String>> headers = connection.getHeaderFields();
                System.out.println("Response Headers:");
                for (Map.Entry<String, List<String>> header : headers.entrySet()) {
                    System.out.println(header.getKey() + ": " + header.getValue());
                }


                BufferedReader in = new BufferedReader(new InputStreamReader(connection.getInputStream()));
                String inputLine;
                StringBuilder responseBody = new StringBuilder();

                while ((inputLine = in.readLine()) != null) {
                    responseBody.append(inputLine).append("\n");
                }
```

```
16
17                URL url = new URL(urlString);
18
19
20                HttpURLConnection connection = (HttpURLConnection) url.openConnection();
21
22
23                connection.setRequestMethod("GET");
24
25
26                Map<String, List<String>> headers = connection.getHeaderFields();
27                System.out.println("Response Headers:");
28                for (Map.Entry<String, List<String>> header : headers.entrySet()) {
29                    System.out.println(header.getKey() + ": " + header.getValue());
30                }
31
32
33                BufferedReader in = new BufferedReader(new InputStreamReader(connection.getInputStream()));
34                String inputLine;
35                StringBuilder responseBody = new StringBuilder();
36
37                while ((inputLine = in.readLine()) != null) {
38                    responseBody.append(inputLine).append("\n");
39                }
40                in.close();
41
42
43                System.out.println("\nResponse Body:");
44                System.out.println(responseBody.toString());
45
46            } catch (IOException e) {
47                e.printStackTrace();
48            }
49        }
50    }
51
52
53
```

Output -

```
    <img alt="" aria-hidden="true" width="81" height="612" style="left: calc(50% - 2px); height: auto; max-width: 9vw;" class="d-none d-md-block position-absolute
  </div>

  <div class="col-11 ml-2 ml-md-6">
    <div class="river-mktg js-build-in-trigger d-flex gutter gutter-spacious my-5 my-sm-7 my-md-8 position-relative flex-column-reverse flex-md-items-center fle
  <div class="col-12 py-3 mb-2 js-build-in-item col-sm-10 col-md-6 text-left col-lg-6 build-in-slideX-right">
    <div class="pr-md-4">


      |

      <h2 class="color-fg-default mb-3 f2-mktg color-fg-muted"><em>GitHub Advanced Security</em> enables you to find and fix vulnerabilities with ease and ship se

        <a class="link-mktg text-semibold color-fg-default py-1 f3-mktg" href="/enterprise/advanced-security" data-analytics-event="{&quot;category&quot;:&quot;Di
  Dive into GitHub Advanced Security <svg xmlns="http://www.w3.org/2000/svg" class="octicon arrow-symbol-mktg" width="16" height="16" viewBox="0 0 16 16" fill="no

/a>

    </div>
  </div>

    <div class="col-12 py-3 col-md-6 col-lg-6">
      <div class="position-relative">

      <div class="d-flex flex-column position-relative">
        <div class="js-build-in-item build-in-slideX-right border overflow-hidden rounded-2 position-relative left-6 z-1" style="max-width: 541px; margin-top: -30
          <img src="https://github.githubassets.com/assets/illu-ghas-list-84af1f1ce2b8.png" alt="" loading="lazy" decoding="async" width="1084" height="600" class
        </div>

        <img alt="" aria-hidden="true" width="1000" height="1000" class="position-absolute d-none d-md-block events-none js-build-in-item build-in-fade" style="bo
      </div>

      </div>
    </div>
/div>
    <div class="mb-6 mb-md-12 pb-3 js-build-in-trigger">
      <div class="py-3 js-build-in-item col-sm-10 col-md-6 text-left col-lg-7 build-in-slideX-left">
        <div class="gradient-border-mktg d-inline-block z-1 position-relative px-2 lh-condensed f6-mktg" style="top: -1px">
```

5] Task 5: Java Networking and Serialization

Develop a basic TCP client and server application where the client sends a serialized object with 2 numbers and operation to be performed on them to the server, and the server computes the result and sends it back to the client. for eg, we could send 2, 2, "+" which would mean 2 + 2

Solution:-
Code -
Operation.java

Operation.java | Server.java | Client.java

```
1  package com.assignment;
2
3
4      import java.io.Serializable;
5
6      public class Operation implements Serializable {
7          private static final long serialVersionUID = 1L;
8
9          private double num1;
10         private double num2;
11         private String operation;
12
13         public Operation(double num1, double num2, String operation) {
14             this.num1 = num1;
15             this.num2 = num2;
16             this.operation = operation;
17         }
18
19         public double getNum1() {
20             return num1;
21         }
22
23         public double getNum2() {
24             return num2;
25         }
26
27         public String getOperation() {
28             return operation;
29         }
30     }
31
32
33
```

Server.java

Operation.java | Server.java | Client.java

```java
package com.assignment;



    import java.io.*;
    import java.net.ServerSocket;
    import java.net.Socket;

    public class Server {
        public static void main(String[] args) {
            int port = 12345;

            try (ServerSocket serverSocket = new ServerSocket(port)) {
                System.out.println("Server is listening on port " + port);

                while (true) {
                    try (Socket socket = serverSocket.accept();
                         ObjectInputStream ois = new ObjectInputStream(socket.getInputStream());
                         ObjectOutputStream oos = new ObjectOutputStream(socket.getOutputStream())) {

                        Operation operation = (Operation) ois.readObject();
                        double result = performOperation(operation);

                        oos.writeObject(result);
                        oos.flush();
                    } catch (IOException | ClassNotFoundException e) {
                        e.printStackTrace();
                    }
                }
            } catch (IOException e) {
                e.printStackTrace();
            }
        }

        private static double performOperation(Operation operation) {
            double num1 = operation.getNum1();
            double num2 = operation.getNum2();
            String op = operation.getOperation();
```

Operation.java | Server.java | Client.java

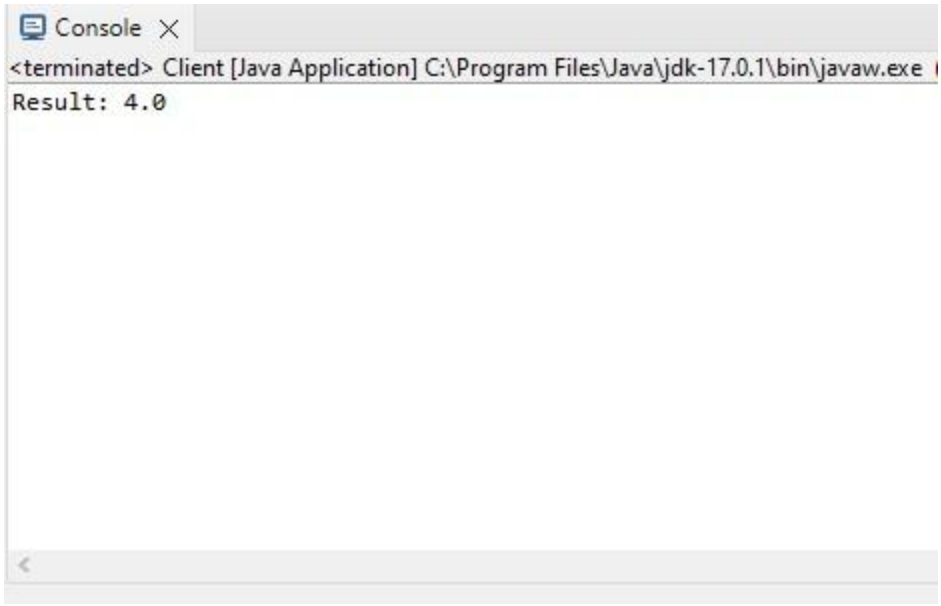
```java
                        oos.writeObject(result);
                        oos.flush();
                    } catch (IOException | ClassNotFoundException e) {
                        e.printStackTrace();
                    }
                }
            } catch (IOException e) {
                e.printStackTrace();
            }
        }

        private static double performOperation(Operation operation) {
            double num1 = operation.getNum1();
            double num2 = operation.getNum2();
            String op = operation.getOperation();

            switch (op) {
                case "+":
                    return num1 + num2;
                case "-":
                    return num1 - num2;
                case "*":
                    return num1 * num2;
                case "/":
                    if (num2 != 0) {
                        return num1 / num2;
                    } else {
                        throw new ArithmeticException("Division by zero");
                    }
                default:
                    throw new IllegalArgumentException("Invalid operation: " + op);
            }
        }
    }
```

Server program output -

Client.java

```java
package com.assignment;


    import java.io.*;
    import java.net.Socket;

    public class Client {
        public static void main(String[] args) {
            String host = "localhost";
            int port = 12345;

            Operation operation = new Operation(2, 2, "+");

            try (Socket socket = new Socket(host, port);
                 ObjectOutputStream oos = new ObjectOutputStream(socket.getOutputStream());
                 ObjectInputStream ois = new ObjectInputStream(socket.getInputStream())) {

                oos.writeObject(operation);
                oos.flush();

                double result = (double) ois.readObject();
                System.out.println("Result: " + result);

            } catch (IOException | ClassNotFoundException e) {
                e.printStackTrace();
            }
        }
    }
```

Client output -



6] Task 6: Java 8 Date and Time API

Write a program that calculates the number of days between two dates input by the user.

Solution:-

Code -

DateCalulator.java

```
1  package com.assignment;
2  import java.time.LocalDate;
3  import java.time.format.DateTimeFormatter;
4  import java.time.temporal.ChronoUnit;
5  import java.util.Scanner;
6  public class DateCalulator {
7
8
9
10
11
12         public static void main(String[] args) {
13             Scanner scanner = new Scanner(System.in);
14             DateTimeFormatter df = DateTimeFormatter.ofPattern("yyyy-MM-dd");
15
16
17             System.out.print("Enter the first date (yyyy-MM-dd): ");
18             String date1 = scanner.nextLine();
19             LocalDate firstDate = LocalDate.parse(date1, df);
20
21
22             System.out.print("Enter the second date (yyyy-MM-dd): ");
23             String date2 = scanner.nextLine();
24             LocalDate secondDate = LocalDate.parse(date2, df);
25
26
27             long daysBetween = ChronoUnit.DAYS.between(firstDate, secondDate);
28
29
30             System.out.println("Number of days between " + firstDate + " and " + secondDate + ": " + daysBetween);
31         }
32     }
33
34
```

Output -

```
Console
<terminated> DateCalulator [Java Application] C:\Program Files\Java\jdk-17.0.1\bin\javaw.exe (03-Jun-2024, 1:20:
Enter the first date (yyyy-MM-dd): 2024-01-01
Enter the second date (yyyy-MM-dd): 2024-01-15
Number of days between 2024-01-01 and 2024-01-15: 14
```

7] Task 7: Timezone

Create a timezone converter that takes a time in one timezone and converts it to another timezone.

Solution:-

Code -

Timezone.java

```java
public class Timezone {


        public static void main(String[] args) {
            Scanner scanner = new Scanner(System.in);
            DateTimeFormatter df1 = DateTimeFormatter.ofPattern("yyyy-MM-dd HH:mm");


            System.out.print("Enter the date and time (yyyy-MM-dd HH:mm): ");
            String date = scanner.nextLine();
            LocalDateTime localDateTime = LocalDateTime.parse(date, df1);


            System.out.print("Enter the source timezone (e.g., America/New_York): ");
            String time1 = scanner.nextLine();
            ZoneId sourceZoneId = ZoneId.of(time1);


            System.out.print("Enter the destination timezone (e.g., Europe/London): ");
            String time2 = scanner.nextLine();
            ZoneId destinationZoneId = ZoneId.of(time2);


            ZonedDateTime sourceZonedDateTime = localDateTime.atZone(sourceZoneId);
            ZonedDateTime destinationZonedDateTime = sourceZonedDateTime.withZoneSameInstant(destinationZoneId);


            System.out.println("Time in " + time2 + ": " + destinationZonedDateTime.format(df1));
        }
    }
```

Output -


Console
<terminated> Timezone [Java Application] C:\Program Files\Java\jdk-17.0.1\bin\javaw.exe (03-Jun-2024, 1:31:27 am – 1:32:11 am) [pid: 100
Enter the date and time (yyyy-MM-dd HH:mm): 2024-06-03 01:32
Enter the source timezone (e.g., America/New_York): America/New_York
Enter the destination timezone (e.g., Europe/London): Europe/London
Time in Europe/London: 2024-06-03 06:32