#Sheet_4

1. Write a Java program to create a class called "Person" with a name and age attribute. Create two instances of the "Person" class, set their attributes using the constructor, and print their name and age?

```java
// Person.java
public class Person {
    private String name;
    private int age;
    public Person(String name, int age) {
        this.name = name;
        this.age = age;
    }
    public String getName() {
        return name;
    }
    public int getAge() {
        return age;
    }
}
```

```java
// Main.java
public class Main {
  public static void main(String[] args) {
    Person person1 = new Person("Ean Craig", 11);
    Person person2 = new Person("Evan Ross", 12);
    System.out.println(person1.getName() + " is " + person1.getAge() + " years old.");
    System.out.println(person2.getName() + " is " + person2.getAge() + " years old.\n");
  }
}
```

2. Write a Java program to create a class called "Dog" with a name and breed attribute. Create two instances of the "Dog" class, set their attributes using the constructor and modify the attributes using the setter methods and print the updated values?

```
2  public class Dog {
3    private String name;
4    private String breed;
5
6    public Dog(String name, String breed) {
7      this.name = name;
8      this.breed = breed;
9    }
10
11   public String getName() {
12     return name;
13   }
14
15   public void setName(String name) {
16     this.name = name;
17   }
18
19   public String getBreed() {
20     return breed;
21   }
22
23   public void setBreed(String breed) {
24     this.breed = breed;
25   }
26 }
```

```
// Main.java
public class Main {
  public static void main(String[] args) {
    Dog dog1 = new Dog("Buddy", "Golden Retriever");
    Dog dog2 = new Dog("Charlie", "Bulldog");

    System.out.println(dog1.getName() + " is a " + dog1.getBreed() + ".");
    System.out.println(dog2.getName() + " is a " + dog2.getBreed() + ".");

    System.out.println("\nSet the new Breed of dog1 and new name of dog2:");
    dog1.setBreed("Labrador Retriever");
    dog2.setName("Daisy");

    System.out.println(dog1.getName() + " is now a " + dog1.getBreed() + ".");
    System.out.println(dog2.getName() + " is now a " + dog2.getBreed() + ".");
  }
}
```

3. Write a Java program to create a class called "Rectangle" with width and height attributes. Calculate the area and perimeter of the rectangle?

```java
public class Rectangle {
  private double width;
  private double height;

  public Rectangle(double width, double height) {
    this.width = width;
    this.height = height;
  }
  public double getWidth() {
    return width;
  }
  public void setWidth(double width) {
    this.width = width;
  }
  public double getHeight() {
    return height;
  }
  public void setHeight(double height) {
    this.height = height;
  }
  public double getArea() {
    return width * height;
  }
  public double getPerimeter() {
    return 2 * (width + height);
  }
}
```

```java
//Main.java
public class Main {
  public static void main(String[] args) {
    Rectangle rectangle = new Rectangle(7, 12);

    System.out.println("The area of the rectangle is " + rectangle.getArea());
    System.out.println("The perimeter of the rectangle is " + rectangle.getPerimeter());

    rectangle.setWidth(6);
    rectangle.setHeight(12);

    System.out.println("\nThe area of the rectangle is now " + rectangle.getArea());
    System.out.println("The perimeter of the rectangle is now " + rectangle.getPerimeter());
  }
}
```

4. Write a Java program to create a class called "Book" with attributes for title, author, and ISBN, and methods to add and remove books from a collection?

```
package sara;
import java.util.ArrayList;

public class Book {
    
     private String title;
      private String author;
      private String ISBN;
      private static ArrayList < Book > bookCollection = new ArrayList < Book > ();

      public Book(String title, String author, String ISBN) {
        this.title = title;
        this.author = author;
        this.ISBN = ISBN;
      }

      public String get_Title() {
        return title;
      }

      public void set_Title(String title) {
        this.title = title;
      }

      public String get_Author() {
        return author;
      }

      public void set_Author(String author) {
        this.author = author;
      }


        public String get_ISBN() {
          return ISBN;
        }

        public void set_ISBN(String ISBN) {
          this.ISBN = ISBN;
        }

        public static void add_Book(Book book) {
          bookCollection.add(book);
        }

        public static void remove_Book(Book book) {
          bookCollection.remove(book);
        }

        public static ArrayList < Book > get_BookCollection() {
          return bookCollection;
        }



}
```

MyClass.java × Book.java

```java
package sara;

import java.util.Arrays;

public class MyClass {



    public static void main(String[] args) {

        Book book1 = new Book("The C Programming Language", "Dennis Ritchie, Brian Kernighan", "9780131101630");
        Book book2 = new Book("An Introduction to Python", "Guido van Rossum", "9355423489");
        Book.add_Book(book1);
        Book.add_Book(book2);
        ArrayList < Book > bookCollection = Book.get_BookCollection();
        System.out.println("List of books:");
        for (Book book: bookCollection) {
          System.out.println(book.get_Title() + " by " + book.get_Author() + ", ISBN: " + book.get_ISBN());
        }
        Book.remove_Book(book1);
        System.out.println("\nAfter removing " + book1.get_Title() + ":");
        System.out.println("List of books:");
        for (Book book: bookCollection) {
          System.out.println(book.get_Title() + " by " + book.get_Author() + ", ISBN: " + book.get_ISBN());
        }
      }



}
```

Console X

<terminated> MyClass [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (19 May 2023, 23:56:54 – 23:56:54) [pid: 16312]

```
List of books:
The C Programming Language by Dennis Ritchie, Brian Kernighan, ISBN: 9780131101630
An Introduction to Python by Guido van Rossum, ISBN: 9355423489

After removing The C Programming Language:
List of books:
An Introduction to Python by Guido van Rossum, ISBN: 9355423489
```

5. Write a Java program to create a class called "Employee" with a name, job title, and salary attributes, and methods to calculate and update salary?

```java
//Employee.java
public class Employee {
  private String name;
  private String jobTitle;
  private double salary;

  public Employee(String name, String jobTitle, double salary) {
    this.name = name;
    this.jobTitle = jobTitle;
    this.salary = salary;
  }

  public String getName() {
    return name;
  }

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

  public String getJobTitle() {
    return jobTitle;
  }

  public void setJobTitle(String jobTitle) {
    this.jobTitle = jobTitle;
  }

  public double getSalary() {
    return salary;
  }

  public void setSalary(double salary) {
    this.salary = salary;
  }

  public void raiseSalary(double percentage) {
    salary = salary + salary * percentage / 100;
  }

  public void printEmployeeDetails() {
    System.out.println("Name: " + name);
    System.out.println("Job Title: " + jobTitle);
    System.out.println("Salary: " + salary);
  }
}
```

```java
//Main.java
public class Main {
  public static void main(String[] args) {

    Employee employee1 = new Employee("Franziska Waltraud", "HR Manager", 40000);
    Employee employee2 = new Employee("Hubertus Andrea", "Software Engineer", 60000);
    System.out.println("\nEmployee Details:");
    employee1.printEmployeeDetails();
    employee2.printEmployeeDetails();

    employee1.raiseSalary(8);
    employee2.raiseSalary(12);

    System.out.println("\nAfter raising salary:");
    System.out.println("\n8% for 'Franziska Waltraud':");
    employee1.printEmployeeDetails();
    System.out.println("\n12% for 'Hubertus Andrea':");
    employee2.printEmployeeDetails();
  }
}
```

6. Write a Java program to create a class called "Bank" with a collection of accounts and methods to add and remove accounts, and to deposit and withdraw money. Also define a class called "Account" to maintain account details of a particular customer?

MyClass.java | *Account.java | Bank.java

```java
package sara;

public class Account {

	private String name;
	private String accountNumber;
	private double balance;

	public Account(String name, String accountNumber, double balance) {
	  this.name = name;
	  this.accountNumber = accountNumber;
	  this.balance = balance;
	}

	public String getName() {
	  return name;
	}

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

	public double getBalance() {
	  return balance;
	}

	public void setBalance(double balance) {
	  this.balance = balance;
	}

	public void deposit(double amount) {
	  balance += amount;
	}

	public void withdraw(double amount) {
	  balance -= amount;
	}

	public String getAccountInfo() {
	  return "Name: " + name + ", Account Number: " + accountNumber + ", Balance: " + balance;
	}


}
```

MyClass.java | *Account.java | Bank.java

```java
package sara;
import java.util.ArrayList;


public class Bank {


    private ArrayList < Account > accounts;

      public Bank() {
        accounts = new ArrayList < Account > ();
      }

      public void addAccount(Account account) {
        accounts.add(account);
      }

      public void removeAccount(Account account) {
        accounts.remove(account);
      }

      public void depositMoney(Account account, double amount) {
        account.deposit(amount);
      }

      public void withdrawMoney(Account account, double amount) {
        account.withdraw(amount);
      }

      public ArrayList < Account > getAccounts() {
        return accounts;
      }


}
```

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


        Bank bank = new Bank();

        Account account1 = new Account("Peter Irmgard", "C0011", 5000);
        Account account2 = new Account("Katja Ruedi", "C0121", 4500);
        Account account3 = new Account("Marcella Gebhard", "C0222", 20000);

        bank.addAccount(account1);
        bank.addAccount(account2);
        bank.addAccount(account3);

        ArrayList < Account > accounts = bank.getAccounts();

        for (Account account: accounts) {
          System.out.println(account.getAccountInfo());
        }

        System.out.println("\nAfter depositing 1000 into account1:");
        bank.depositMoney(account1, 1000);
        System.out.println(account1.getAccountInfo());
        System.out.println("No transaction in account2:");
        System.out.println(account2.getAccountInfo());
        System.out.println("After withdrawing 5000 from account3:");
        bank.withdrawMoney(account3, 5000);
        System.out.println(account3.getAccountInfo());
      }

}
```

Console ×

<terminated> MyClass [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (20 May 2023, 00:27:55 – 00:27:55) [pid

```
Name: Peter Irmgard, Account Number: C0011, Balance: 5000.0
Name: Katja Ruedi, Account Number: C0121, Balance: 4500.0
Name: Marcella Gebhard, Account Number: C0222, Balance: 20000.0

After depositing 1000 into account1:
Name: Peter Irmgard, Account Number: C0011, Balance: 6000.0
No transaction in account2:
Name: Katja Ruedi, Account Number: C0121, Balance: 4500.0
After withdrawing 5000 from account3:
Name: Marcella Gebhard, Account Number: C0222, Balance: 15000.0
```

7- Write a Java program to create a class called "Airplane" with a flight number, destination, and departure time attributes, and methods to check flight status and delay?

```java
import java.time.LocalTime;

public class Airplane {

	private String flightNumber;
	private String destination;
	private LocalTime scheduledDeparture;
	private int delayTime;

	public Airplane(String flightNumber, String destination, LocalTime scheduledDeparture) {
	  this.flightNumber = flightNumber;
	  this.destination = destination;
	  this.scheduledDeparture = scheduledDeparture;
	  this.delayTime = 0;
	}

	public String getFlightNumber() {
	  return flightNumber;
	}

	public void setFlightNumber(String flightNumber) {
	  this.flightNumber = flightNumber;
	}

	public String getDestination() {
	  return destination;
	}

	public void setDestination(String destination) {
	  this.destination = destination;
	}

	public LocalTime getScheduledDeparture() {
	  return scheduledDeparture;
	}


	public void setScheduledDeparture(LocalTime scheduledDeparture) {
	  this.scheduledDeparture = scheduledDeparture;
	}

	public int getDelayTime() {
	  return delayTime;
	}

	public void delay(int minutes) {
	  this.delayTime = minutes;
	  this.scheduledDeparture = this.scheduledDeparture.plusMinutes(minutes);
	}

	public void checkStatus() {
	  if (delayTime == 0) {
	    System.out.println("Flight " + flightNumber + " is on time.");
	  } else {
	    System.out.println("Flight " + flightNumber + " is delayed by " + delayTime + " minutes.");
	  }
	}


}
```

*MyClass.java × Account.java Airplane.java

```java
package sara;

import java.util.Arrays;

public class MyClass {


    public static void main(String[] args) {
      // LocalTime.of   LocalTime is a class of  is function take hours and minutes
        Airplane flight1 = new Airplane("CDE345", "London", LocalTime.of(10, 30));
        Airplane flight2 = new Airplane("KUI765", "New York", LocalTime.of(14, 0));
        Airplane flight3 = new Airplane("JUY456", "Paris", LocalTime.of(14, 0));
        System.out.println("Flight Status:");
        flight1.checkStatus();
        flight2.checkStatus();
        flight3.checkStatus();
        flight1.delay(40);
        flight2.delay(110);
        System.out.println("\nCurrent Flight Status:");
        flight1.checkStatus();
        flight2.checkStatus();
        flight3.checkStatus();

    }
}
```

Console ×

<terminated> MyClass [Java Application] C:\Program Files\Java\jdk-17\bin\

```
Flight Status:
Flight CDE345 is on time.
Flight KUI765 is on time.
Flight JUY456 is on time.

Current Flight Status:
Flight CDE345 is delayed by 40 minutes.
Flight KUI765 is delayed by 110 minutes.
Flight JUY456 is on time.
```