Object Oriented Programming
Class and Object

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4 Experiment

4.1 Experiment 1: Creating Class Diagram

Case Study 2:

Dalam suatu perusahaan salah satu data yang diolah adalah data karyawan. Setiap karyawan memiliki id, nama, jenis kelamin, jabatan, jabatan, dan gaji. Setiap mahasiswa juga bisa menampilkan data diri pribadi dan melihat gajinya.

(In a company, one of the data processed is employee data. Each employee has an id, name, gender, job title, position, and salary. Each student can also display their personal data and see their salary.)

1. Gambarkan desain class diagram dari studi kasus 1!
   (Draw the class diagram of case study 1!)
   Answer:

Employee
id: int name: String gender: String title: String salary: int
showBio(): void getSalary(): int

2. Sebutkan Class apa saja yang bisa dibuat dari studi kasus 1!
   (Mention any classes that can be created from case study 1!)
   Answer: The only class you can make in the study case is The Employee class

3. Sebutkan atribut beserta tipe datanya yang dapat diidentifikasi dari masing-masing class dari studi kasus 1!
   (List the attributes and their data types that can be identified from each of the class from case study 1!)
   Answer:

   - id : int
   - name : String
   - gender : String
   - title : String
   - salary : int

4. Sebutkan method-method yang sudah anda buat dari masing-masing class pada studi kasus 1!

   (List the methods that you have created from each class in case study 1!)

   `Answer:`

   - showBio() : void
   - getSalary() : int

4.2 Experiment 2: Create and Access Class Component

Case Study 2:

Perhatikan class diagram dibawah ini. Buatlah program berdasarkan class diagram tersebut!

(Take a look at the class diagram below. Create a program based on the class diagram!)

Mahasiswa
nim: int nama: String alamat: String kelas: String
tampilBiodata(): void

Steps

1. Bukalah text editor atau IDE, misalnya Notepad ++ / netbeans. - (Open a text editor or IDE, for example Notepad++ / netbeans.)
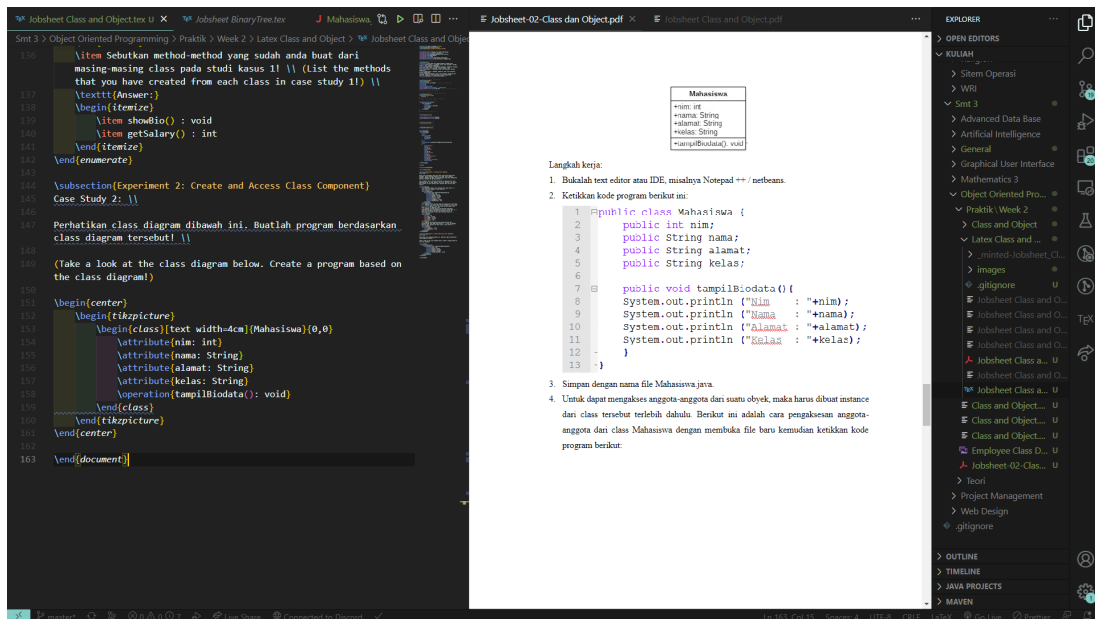
2. Ketikkan kode program berikut ini: - (Type in the following program code:)

```
1   public class Mahasiswa {
2       public int nim;
3       public String nama;
4       public String alamat;
5       public String kelas;
6
7       public void tampilBiodata() {
8           System.out.println("Nim     : " + nim);
9           System.out.println("Name    : " + nama);
10          System.out.println("Alamat  : " + alamat);
11          System.out.println("Kelas   : " + kelas);
12      }
13  }
```

3. Simpan dengan nama file Mahasiswa.java. - (Save it with the filename Mahasiswa.java.)

4. Untuk dapat mengakses anggota-anggota dari suatu obyek, maka harus dibuat instance dari class tersebut terlebih dahulu. Berikut ini adalah cara pengaksesan anggota- anggota dari class Mahasiswa dengan membuka file baru kemudian ketikkan kode program berikut: - (To be able to access the members of an object, an instance of the class must be created first. The following is how to access members of the Student class by opening a new file then typing the following program code:)

```
1  public class TestMahasiswa {
2      public static void main(String[] args) {
3          Mahasiswa mhs1 = new Mahasiswa();
4          mhs1.nim = 101;
5          mhs1.nama = "Lestari";
6          mhs1.alamat = "Jl. Vinolia No 1A";
7          mhs1.kelas = "1A";
8          mhs1.tampilBiodata();
9      }
10 }
```

5. Simpan file dengan TestMahasiswa.java - (Save the file as TestMahasiswa.java)

6. Jalankan class TestMahasiswa - (Run the TestMahasiswa class)

```
1  PS D:\Kuliah>  d:; cd 'd:\Kuliah'; & 'C:\Program
   ↪ Files\Java\jdk-18.0.2.1\bin\java.exe'
   ↪ '-XX:+ShowCodeDetailsInExceptionMessages' '-cp'
   ↪ 'C:\Users\G4CE-PC\AppData\Roaming\Code\User\
   ↪ workspaceStorage\80d97a47d24665dc0bce7ab1e048ecbd\
   ↪ redhat.java\jdt_ws\Kuliah_28156aa7\bin'
   ↪ 'Experiment2.TestMahasiswa'
2  Nim     : 101
3  Name    : Lestari
4  Alamat  : Jl. Vinolia No 1A
5  Kelas   : 1A
```

7. Jelaskan pada bagian mana proses pendeklarasian atribut pada program diatas!
   - (Explain which part of the attribute declaration process in the program above!)
   Answer: attribute declaration happends in line 2 until line 5 in Mahasiswa Class

8. Jelaskan pada bagian mana proses pendeklarasian method pada program diatas!
   - (Explain which part of the method declaration process in the program above!)
   Answer: method declaration happends in line 7 until line 12 in Mahasiswa Class

9. Berapa banyak objek yang di instansiasi pada program diatas! - (How many objects are instantiated in the above program!)
   Answer: Only one object instantiated in the TestMahasiswa Class.

10. Apakah yang sebenarnya dilakukan pada sintaks program "mhs1.nim=101" ? - (What does the program syntax "mhs1.nim=101" actually do?)
    Answer: it instantiate a value to one of the mhs1's attribute

11. Apakah yang sebenarnya dilakukan pada sintaks program "mhs1.tampilBiodata()" ? - (What does the syntax of the program "mhs1.tampilBiodata()" actually do?)

Answer: it calls a function that the mhs1 has, it is used to print the bio of the mhs1.

12. Instansiasi 2 objek lagi pada program diatas! - (Instantiate 2 more objects in the program above!)

```java
public class TestMahasiswa {
    public static void main(String[] args) {
        Mahasiswa mhs1 = new Mahasiswa();
        mhs1.nim = 101;
        mhs1.nama = "Lestari";
        mhs1.alamat = "Jl. Vinolia No 1A";
        mhs1.kelas = "1A";
        mhs1.tampilBiodata();

        Mahasiswa mhs2 = new Mahasiswa();
        Mahasiswa mhs3 = new Mahasiswa();
    }
}
```

4.3   Experiment 3: Create Methods with Arguments/Parameters and Returns

Steps

1. Bukalah text editor atau IDE, misalnya Notepad ++ / netbeans. - (Open a text editor or IDE, for example Notepad++ / netbeans.)

2. Ketikkan kode program berikut ini: - (Type in the following program code:)

```java
public class Barang {
    public String namaBrg;
    public String jenisBrg;
    public int stok;

    public void tampilBarang() {
        System.out.println("Nama Barang    : " + namaBrg);
        System.out.println("Jenis Barang   : " + jenisBrg);
        System.out.println("Stok           : " + stok);
    }

    public int tambahStok(int brgMasuk) {
        int stokBaru = brgMasuk+stok;
        return stokBaru;
```

```
15        }
16    }
```

3. Simpan dengan nama file Barang.java - (Save it with the file name Barang.java)

4. Untuk dapat mengakses anggota-anggota dari suatu obyek, maka harus dibuat instance dari class tersebut terlebih dahulu. Berikut ini adalah cara pengaksesan anggota-anggota dari class Barang dengan membuka file baru kemudian ketikkan kode program berikut: - (To be able to access the members of an object, an instance of the class must be created first. The following is how to access the members of the Goods class by opening a new file then typing the following program code:)

```
1    public class TestBarang {
2        public static void main(String[] args) {
3            Barang brg1 = new Barang();
4            brg1.namaBrg = "Pensil";
5            brg1.jenisBrg = "ATK";
6            brg1.stok = 10;
7            brg1.tampilBarang();
8
9            System.out.println("Stok baru adalah " +
       ↪  brg1.tambahStok(20));
10       }
11   }
```

5. Simpan dengan nama file TestBarang.java - (Save it with the file name TestBarang.java)

6. Jalankan program tersebut! - (Run the program!)

7. Apakah fungsi argumen dalam suatu method? - (What is the function of arguments in a method?)
   Answer: it is used as a variable input to be used inside the methods

8. Ambil kesimpulan tentang kegunaan dari kata kunci return , dan kapan suatu method harus memiliki return! - (Draw conclusions about the use of the return keyword, and when a method should have a return!)
   Answer: return is used to give a value when a method is called. the return keyword is used when a method data type is not void.

4.4   Assignment

1. Suatu toko persewaan video game salah satu yang diolah adalah peminjaman, dimana data yang dicatat ketika ada orang yang melakukan peminjaman adalah

id, nama member, nama game, dan harga yang harus dibayar. Setiap peminja-man bisa menampilkan data hasil peminjaman dan harga yang harus dibayar. Buatlah class diagram pada studi kasus diatas! - (One of the video game rental shops that is processed is borrowing, where the data recorded when someone borrows is the id, member name, game name, and price to be paid. Each loan can display the loan result data and the price to be paid. Draw a class diagram for the case study above!)

Penjelasan: -(Explanation:)

- Harga yang harus dibayar diperoleh dari lama sewa x harga. - (The price to be paid is obtained from the length of the lease x the price.)
- Diasumsikan 1x transaksi peminjaman game yang dipinjam hanya 1 game saja. - (It is assumed that 1x game loan transaction is borrowed only 1 game.)

Answer:

Peminjaman
id: int namaMember: String namaGame: String harga: int
tampilData(): void hargaBayar(): int

2. Buatlah program dari class diagram yang sudah anda buat di no 1! - (Create a program from the class diagram that you have created in number 1!)

```java
public class Peminjaman {
    public int id;
    public String namaMember;
    public String namaGame;
    public int harga;

    public void tampilData() {
        System.out.println("ID Transaksi: " + id);
        System.out.println("Nama Member : " + namaMember);
        System.out.println("Nama Game   : " + namaGame);
        System.out.println("Harga Game  : " + harga);
    }

```

```java
14    public int hargaBayar(int lamaSewa) {
15        return lamaSewa * lamaSewa;
16    }
17 }
```
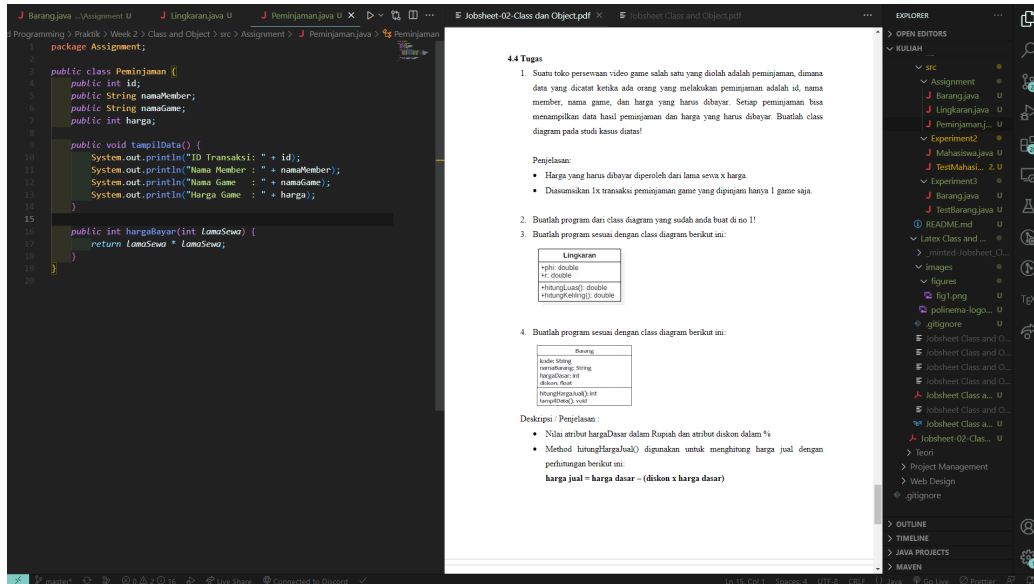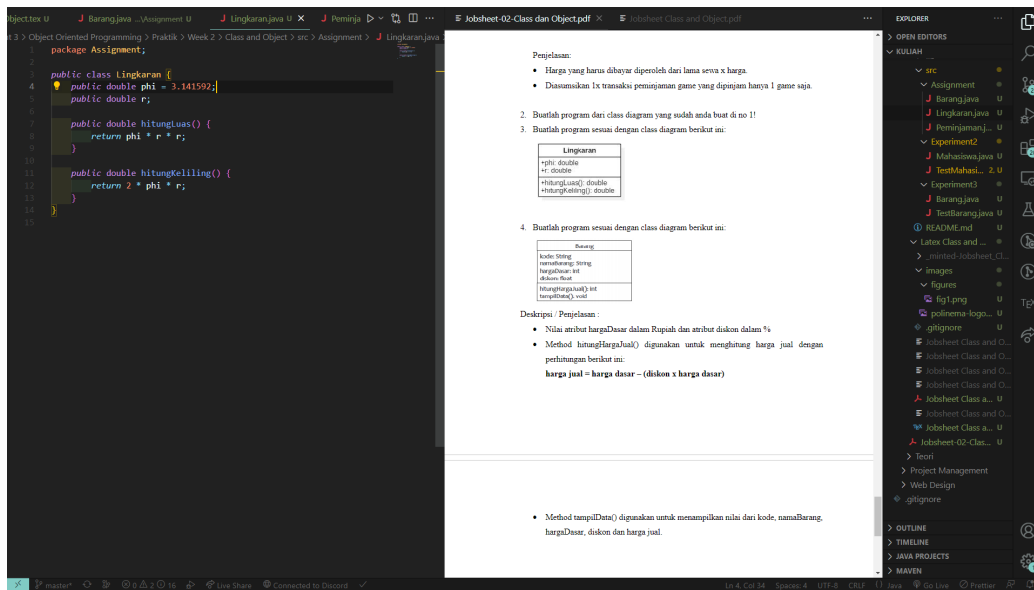

3. Buatlah program sesuai dengan class diagram berikut ini: - (Create a program according to the following class diagram:)

Lingkaran
phi: double r: double
hitungLuas(): double hitungKeliling(): double

```java
1  public class Lingkaran {
2      public double phi = 3.141592;
3      public double r;
4
5      public double hitungLuas() {
6          return phi * r * r;
7      }
8
9      public double hitungKeliling() {
10          return 2 * phi * r;
11      }
12 }
```

4. Buatlah program sesuai dengan class diagram berikut ini: - (Create a program according to the following class diagram:)

Barang
kode: String namaBarang: String hargaDasar: int diskon: float
hitungHargaJual(): int tampilData(): void

Deskripsi / Penjelasan : - (Description / Explanation :)

- Nilai atribut hargaDasar dalam Rupiah dan atribut diskon dalam % - (The value of the hargaDasar attribute in Rupiah and the diskon attribute in %)

- Method hitungHargaJual() digunakan untuk menghitung harga jual dengan perhitungan berikut ini:
  - (The calculateSalePrice() method is used to calculate the sale price with the following calculation:)
  harga jual = harga dasar – (diskon x harga dasar)

- Method tampilData() digunakan untuk menampilkan nilai dari kode, namaBarang, hargaDasar, diskon dan harga jual. - (The tampilData() method is used to display the values of kode, namaBarang, hargaDasar, diskon and harga jual.)

```
1  public class Barang {
```

```java
    public String kode;
    public String namaBarang;
    public int hargaDasar;
    public float diskon;

    public int hitungHargaJual() {
        return hargaDasar - ((int) (diskon * hargaDasar));
    }

    public void tampilData() {
        System.out.println("Kode Barang : " + kode);
        System.out.println("Nama Barang : " + namaBarang);
        System.out.println("Harga Barang: Rp" + hargaDasar);
        System.out.println("Diskon      : " + diskon + "%");
        System.out.println("Harga Jual  : Rp" +
            hitungHargaJual());
    }
}
```