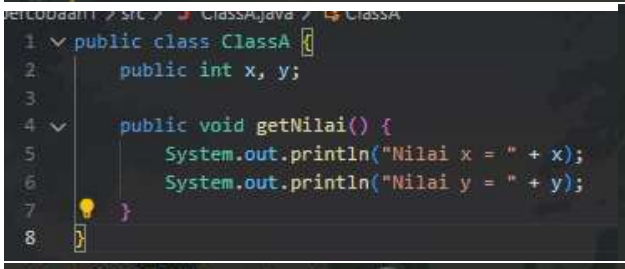
Zid'Avwa Al Bari'i

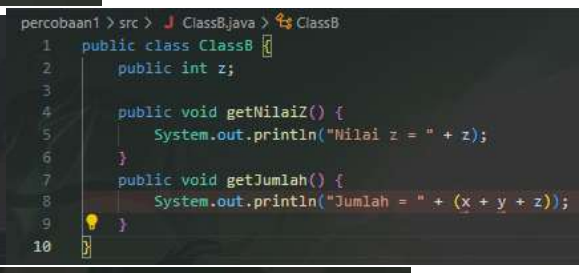
244107020083 / TI – 2I / 26

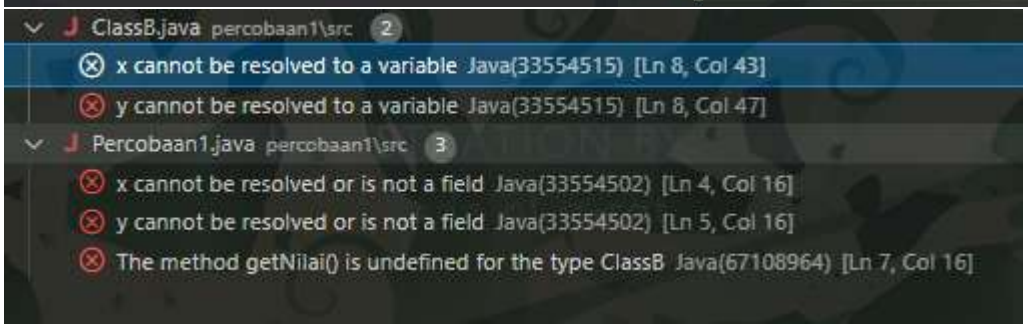
Jobsheet 6

Perrcobaan 1

Code

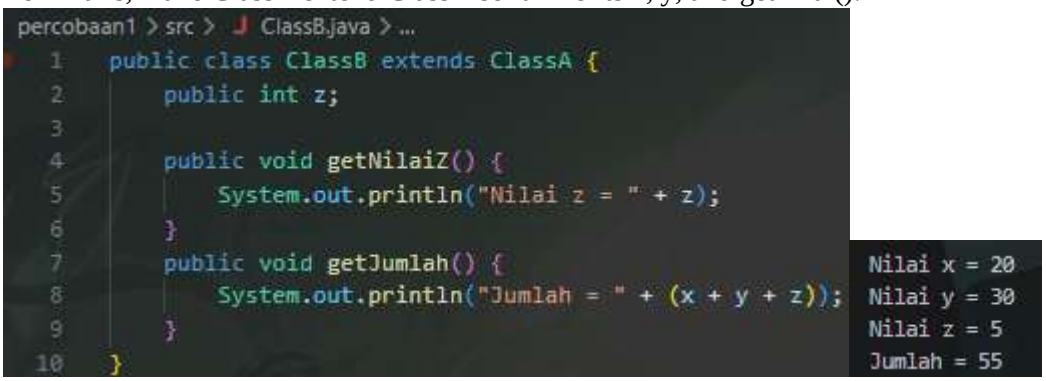






Question

1. Fixing the program so it runs without error:
   The error happens because ClassB tries to use x and y, but they are only defined in ClassA. To fix this, make ClassB extend ClassA so it inherits x, y, and getNilai().



2. Explanation of the error cause:
   The error happened because ClassB tried to access variables x and y that do not exist in its own class. They are declared in ClassA, but since ClassB was not connected to ClassA, the compiler could not find them.

Percobaan 2

Code

```
percobaan2 > src > ClassA.java > ClassA
1  public class ClassA {
2      private int x;
3      private int y;
4
5      public void setX(int x) {
6          this.x = x;
7      }
8
9      public void setY(int y) {
10         this.y = y;
11     }
12
13     public void getNilai() {
14         System.out.println("nilai x:" + x);
15         System.out.println("nilai y:" + y);
16     }
17 }
```

```
percobaan2 > src > ClassB.java > ClassB
1  public class ClassB {
2      private int z;
3
4      public void setZ(int z) {
5          this.z = z;
6      }
7
8      public void getNilaiZ() {
9          System.out.println("nilai Z: " + z);
10     }
11
12     public void getJumlah(int x, int y) {
13         System.out.println("Jumlah: " + (x + y + z));
14     }
15 }
```

```
percobaan2 > src > Percobaan2.java > Percobaan2
1  public class Percobaan2 {
       Run | Debug
2      public static void main(String[] args) {
3          ClassB hitung = new ClassB();
4          hitung.setX(20);     The method setX(i
5          hitung.setY(30);     The method setY(i
6          hitung.setZ(z:5);
7          hitung.getNilai();     The method getN
8          hitung.getNilaiZ();
9          hitung.getJumlah();     The method get
10     }
11 }
```

Question

1. Fix the program in Experiment 2

   The error happens because in Percobaan2, you call methods setX(), setY(), and getNilai() from ClassA, but you only created an object of ClassB, which does not inherit from ClassA.
   Solution: Make ClassB extend ClassA. Then it will inherit x, y, setX(), setY(), and getNilai().

```
percobaan2 > src > ClassA.java > ...
1  public class ClassA {
2      private int x;
3      private int y;
4
5      public void setX(int x) {
6          this.x = x;
7      }
8
9      public void setY(int y) {
10         this.y = y;
11     }
12
13     public int getX() {   // added
14         return x;
15     }
16
17     public int getY() {   // added
18         return y;
19     }
20
21     public void getNilai() {
22         System.out.println("nilai x: " + x);
23         System.out.println("nilai y: " + y);
24     }
25 }
```

```
nilai x: 20
nilai y: 30
nilai Z: 5
Jumlah: 55
```

2. The error in experiment 2 happened because `ClassB` was created without extending `ClassA`. As a result, the object of `ClassB` could not use the methods `setX()`, `setY()`, and `getNilai()` that were defined in `ClassA`. That is why the compiler gave an error.

Percobaan 3

Code

```
src > J Bangunjava > Bangun > ...
1  public class Bangun {
2      protected double phi;
3      protected int r;
4  }
```

```
src > J Tabungjava > Tabung
1  public class Tabung extends Bangun {
2      protected int t;
3
4      public void setSuperPhi(double phi) {
5          super.phi = phi;
6      }
7
8      public void setSuperR(int r) {
9          super.r = r;
10     }
11
12     public void setT(int t) {
13         this.t = t;
14     }
15
16     public void volume() {
17         System.out.println("Volume Tabung adalah: " + (super.phi * super.r * super.r * this.t));
18     }
19 }
```

```
src > J Percobaan3.java > Percobaan3
1  public class Percobaan3 {
       Run | Debug
2      public static void main(String[] args) {
3          Tabung tabung = new Tabung();
4          tabung.setSuperPhi(phi:3.14);
5          tabung.setSuperR(r:10);
6          tabung.setT(t:3);
7          tabung.volume();
8      }
9  }
```

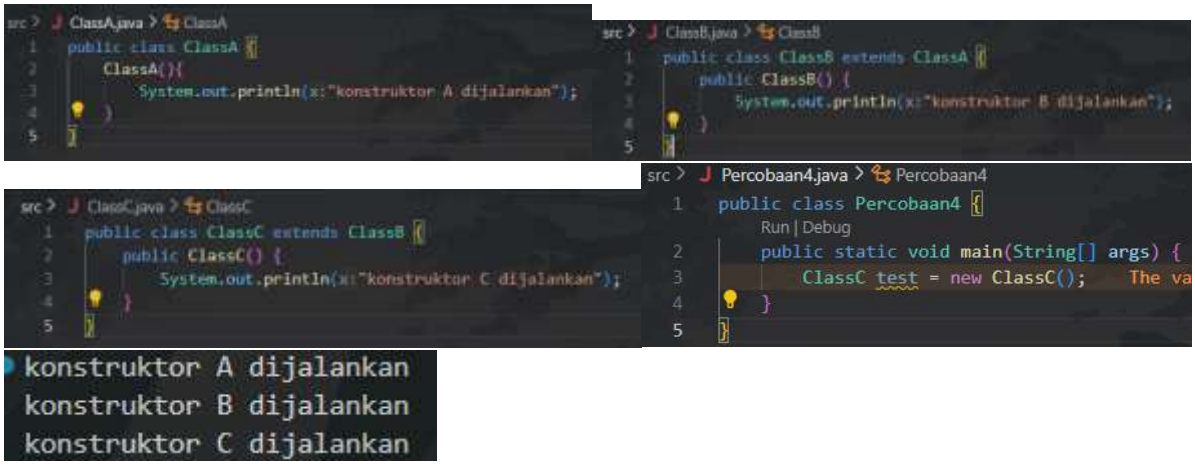
```
Volume Tabung adalah: 942.0
```

Question

1. The keyword super is used to access attributes or methods from the parent class (Bangun). In this program:
   - super.phi = phi; = assigns a value to phi from the parent class.
   - super.r = r; = assigns a value to r from the parent class.
2. super refers to attributes inherited from the parent class (Bangun). Example: super.phi and super.r.
   this refers to attributes that belong to the current class (Tabung). Example: this.t.
   So in the volume() method, super.phi * super.r * super.r * this.t multiplies the parent's values (phi, r) with the child's value (t).
3. The Tabung class can access phi and r because it inherits them from the parent class Bangun using extends.
   Since phi and r are declared as protected in Bangun, they are directly accessible in the child class (Tabung).

Percobaan 4

Code



Question

1. In experiment 4, specify which class belongs to superclasses and subclasses, then explain why!
   - ClassA = superclass (parent class)
   - ClassB = subclass of ClassA (child of A)
   - ClassC = subclass of ClassB (child of B, grandchild of A)

   Explanation:
   ClassB uses extends ClassA, and ClassC uses extends ClassB.
   That means ClassB inherits from ClassA, and ClassC inherits from ClassB (and indirectly from ClassA).
2. Change the contents of the default ClassC constructor as shown
   When you add super(); inside ClassC's constructor, it calls the constructor of ClassB first before executing its own code.
   So, the order of execution becomes:
   - Constructor A runs
   - Constructor B runs
   - Constructor C runs

   There is no difference in output because Java automatically calls the parent constructor (super()) even if it is not written explicitly.
3. When super(); is placed after the print statement
   If super(); is written after System.out.println(...), an error occurs.
   This happens because in Java, super() must always be the first statement in a constructor.
   Constructor execution order:
   When an object of ClassC is created:
   - Constructor of ClassA runs first (superclass)
   - Then constructor of ClassB runs
   - Finally, constructor of ClassC runs
4. What is the super() function in ClassC?
   The super() function is used to call the constructor of the parent class (in this case, ClassB).
   It ensures that the parent's initialization process happens before the child's constructor runs.

Exercise

Code

```java
public class DaftarGaji {
    private Pegawai[] listPegawai;
    private int index;

    public DaftarGaji(int jumlah) {
        listPegawai = new Pegawai[jumlah];
        index = 0;
    }

    public void addPegawai(Pegawai p) {
        if (index < listPegawai.length) {
            listPegawai[index] = p;
            index++;
        }
    }

    public void printSemuaGaji() {
        System.out.println("=== Daftar Gaji Pegawai ===");
        for (Pegawai p : listPegawai) {
            if (p != null) {
                System.out.println("Nama: " + p.getNama() + ", Gaji: " + p.getGaji());
            }
        }
    }
}
```

```java
public class Dosen extends Pegawai {
    private int jumlahSKS;
    private static final int TARIF_SKS = 120000;

    public Dosen(String nip, String nama, String alamat) {
        super(nip, nama, alamat);
    }

    public void setSKS(int jumlahSKS) {
        this.jumlahSKS = jumlahSKS;
    }

    public int getGaji() {
        return jumlahSKS * TARIF_SKS;
    }
}
```

```java
public class Pegawai {
    protected String nip;
    protected String nama;
    protected String alamat;

    public Pegawai(String nip, String nama, String alamat) {
        this.nip = nip;
        this.nama = nama;
        this.alamat = alamat;
    }

    public String getNama() {
        return nama;
    }

    public int getGaji() {
        return 0;
    }
}
```

```java
public class MainInstitusi {
    public static void main(String[] args) {
        Dosen dosen1 = new Dosen(nip:"123", nama:"Dr. Zid", alamat:"Surabaya");
        dosen1.setSKS(jumlahSKS:12);

        Dosen dosen2 = new Dosen(nip:"456", nama:"Prof. Avwa", alamat:"Malang");
        dosen2.setSKS(jumlahSKS:10);

        DaftarGaji daftar = new DaftarGaji(jumlah:2);
        daftar.addPegawai(dosen1);
        daftar.addPegawai(dosen2);

        daftar.printSemuaGaji();
    }
}
```

```
=== Daftar Gaji Pegawai ===
Nama: Dr. Zid, Gaji: 1440000
Nama: Prof. Avwa, Gaji: 1200000
```