REVIEW alpro

Dr. Budi Setiyono, S.Si, MT

Tahapan dalam memecahkan masalah

1. **Menganalisa dan memahami suatu permasalahan** yang bertujuan untuk menemukan kemungkinan penyelesaian terhadap permasalahan.

2. **Merancang algoritma** yang merupakan pola pikir terstruktur yang berisi tahap-tahap penyelesaian suatu permasalahan

3. **Membuat program komputer** yaitu mengubah kode dari algoritma yang telah dibuat ke dalam pernyataan-pernyataan yang sesuai dengan bahasa pemrograman yang dipakai [*coding*]

4. **Menjalankan program** untuk menemukan kesalahan-kesalahan dalam penulisan suatu pernyataan dalam program [*testing*] dan menemukan kesalahan-kesalahan dalam program dan kesalahan yang ditemukan diperbaiki sampai tidak muncul kesalahan lagi [*debugging*]

5. **Melakukan dokumentasi** terhadap setiap langkah yang dilakukan [*documentation*]

Keterangan:

- – Tahap 1 dan 2 : merupakan fase penyelesaian masalah (*problem solving phase*)

- – Tahap 3, 4 dan 5 : termasuk dalam fase implementasi (*implementation phase*)

Pengelompokan struktur proses dalam algoritma

- **Proses urutan (*sequence)*
  - Prosedur proses dalam algoritma yang dilakukan secara urut langkah demi langkah.
  - Sebuah urutan terdiri dari satu atau lebih instruksi. Tiap instruksi dilaksanakan secara berurutan sesuai dengan urutan pelaksanaan, artinya suatu instruksi akan dilaksanakan setelah instruksi sebelumnya telah selesai dilaksanakan.
- **Proses penyeleksian (*selection)*
  - Suatu instruksi dikerjakan jika suatu kondisi tertentu dipenuhi. Dengan adanya proses ini maka ada kemungkinan beberapa jalur aksi yang berbeda berdasarkan kondisi yang ada.

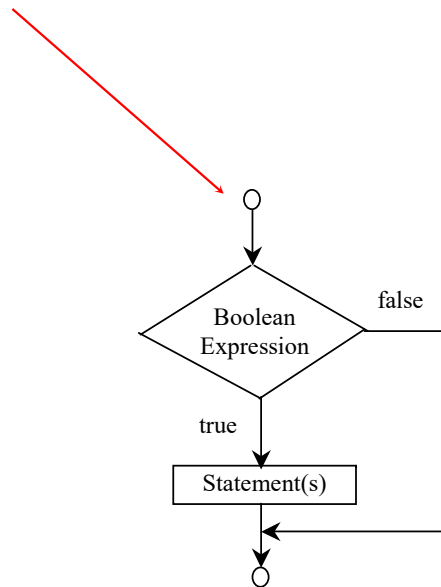## Pengelompokan struktur proses dalam algoritma

- **Proses pengulangan (*looping)*
  - Suatu proses melakukan eksekusi suatu program secara berulang-ulang pada suatu blok instruksi tertentu yang terkendali.
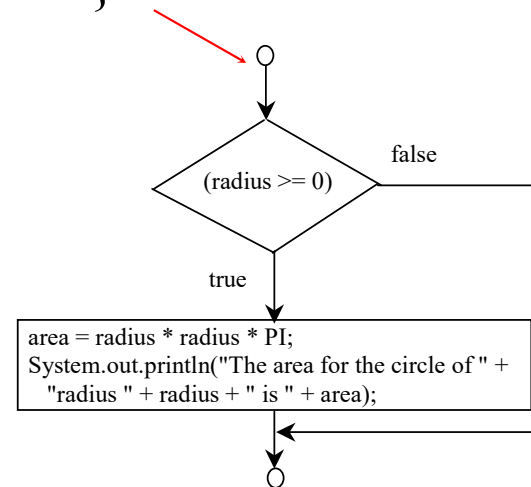
SELECTION

One-way `if` Statements

```
if (boolean-expression) {
  statement(s);
}
```

if (radius >= 0) {

  area = radius * radius * PI;

  System.out.println("The area"

    + " for the circle of radius "

    + radius + " is " + area);

}

Boolean Expression — false / true

Statement(s)

(A)

(radius >= 0) — false / true

area = radius * radius * PI;
System.out.println("The area for the circle of " +
  "radius " + radius + " is " + area);

(B)

Implementasi

```java
public class SelectionMain {
    public static void main(String[] args) {
        double radius, area;

        System.out.print("Masukan radius : ");
        Scanner Input = new Scanner(System.in);
        radius = Input.nextInt();
        if(radius>=0){
            area = radius * radius * Math.PI;
            System.out.println("Luas lingkaran : "+area);
        }
```
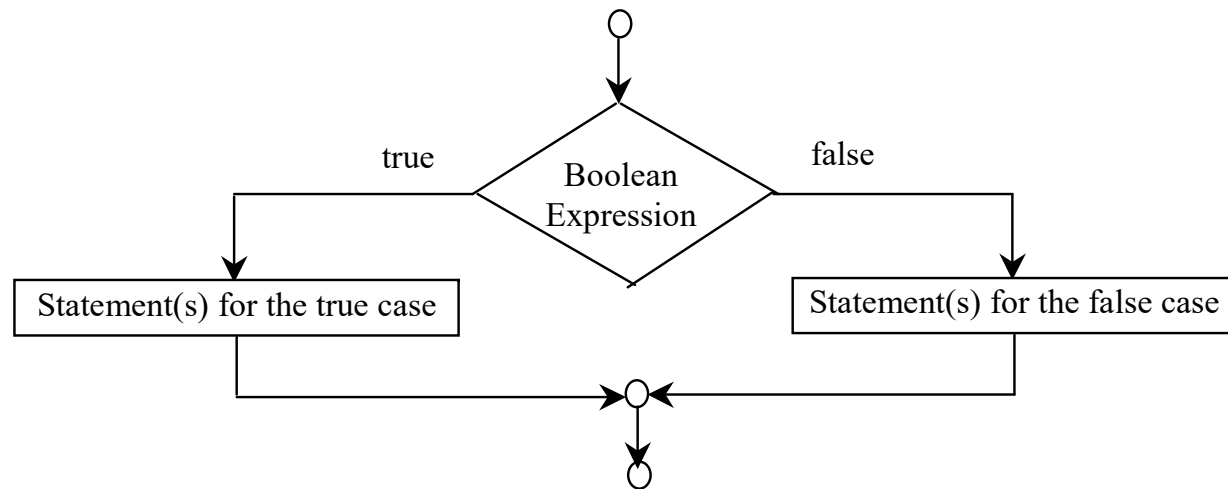
myprojecttest.SelectionMain 〉 main 〉 Input 〉

Output - myProjectTest (run) ✕

```
run:
Masukan radius : 3
Luas lingkaran : 28.274333882308138
BUILD SUCCESSFUL (total time: 10 seconds)
```

The Two-way `if` Statement

```
if (boolean-expression) {
   statement(s)-for-the-true-case;
}
else {
   statement(s)-for-the-false-case;
}
```

Implementasi

```java
9    public class SelectionMain {
10       public static void main(String[] args) {
11           double radius, area;
12
13           System.out.print("Masukan radius : ");
14           Scanner Input = new Scanner(System.in);
15           radius = Input.nextInt();
16           if(radius>=0){
17               area = radius * radius * Math.PI;
18               System.out.println("Luas lingkaran : "+area);
19           }
20           else
21               System.out.println("Radius harus positip mas brow..!!");
22       }
23    }
```

myprojecttest.SelectionMain ⬧ ⓘ main ⬧

Output - myProjectTest (run) ×

```
run:
Masukan radius : -2
Radius harus positip mas brow..!!
BUILD SUCCESSFUL (total time: 6 seconds)
```

Multiple Alternative if Statements

```
if (score >= 90.0)
  grade = 'A';
else
  if (score >= 80.0)
    grade = 'B';
  else
    if (score >= 70.0)
      grade = 'C';
    else
      if (score >= 60.0)
        grade = 'D';
      else
        grade = 'F';
```

Equivalent

```
if (score >= 90.0)
  grade = 'A';
else if (score >= 80.0)
  grade = 'B';
else if (score >= 70.0)
  grade = 'C';
else if (score >= 60.0)
  grade = 'D';
else
  grade = 'F';
```

Implementasi

```
22          System.out.print("Masukkan Nilai Angka : ");
23          Scanner Input = new Scanner(System.in);
24          nilai = Input.nextInt();
25          if(nilai>=90)
26              grade = 'A';
27          else if (nilai>=80)
28              grade = 'B';
29          else if (nilai>=70)
30              grade = 'C';
31          else if (nilai>=60)
32              grade = 'D';
33          else
34              grade = 'F';
35          System.out.println("Nilai dalam huruf : "+grade);
36      }
```

myprojecttest.MultiSelectionMain ≫ ⓘ main ≫
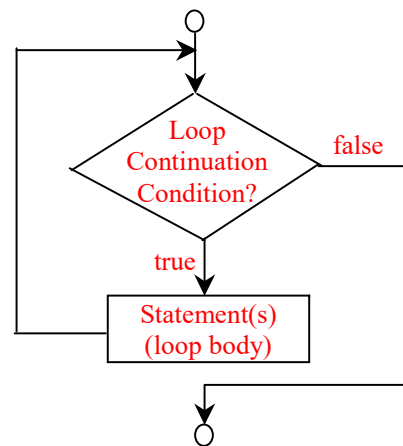
Output - myProjectTest (run) ×

```
run:
Masukkan Nilai Angka : 62
Nilai dalam huruf : D
BUILD SUCCESSFUL (total time: 3 seconds)
```
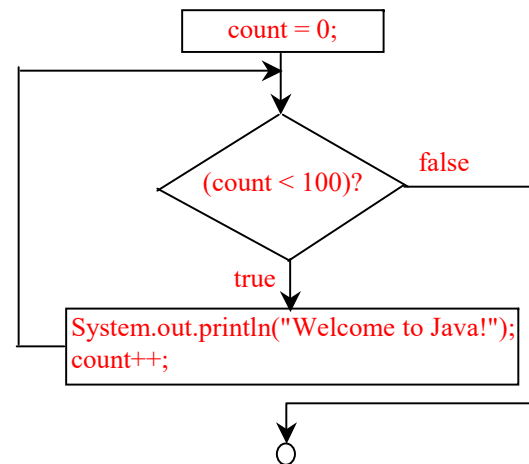
LOOPING

while Loop Flow Chart

```
while (loop-continuation-condition) {
  // loop-body;
  Statement(s);
}
```

```
int count = 0;
while (count < 100) {
  System.out.println("Welcome to Java!");
  count++;
}
```


(A)

(B)

Trace while Loop

Initialize count

```
int count = 0;

while (count < 2) {
  System.out.println("Welcome to Java!");
  count++;
}
```

Trace while Loop, cont.

(count < 2) is true

```java
int count = 0;

while (count < 2) {

  System.out.println("Welcome to Java!");

  count++;

}
```

Trace while Loop, cont.

Print Welcome to Java

```
int count = 0;

while (count < 2) {

  System.out.println("Welcome to Java!");

  count++;

}
```

Trace while Loop, cont.

Increase count by 1
count is 1 now

```
int count = 0;

while (count < 2) {

  System.out.println("Welcome to Java!");

  count++;

}
```

Trace while Loop, cont.

(count < 2) is still true since count is 1

```java
int count = 0;

while (count < 2) {

  System.out.println("Welcome to Java!");

  count++;

}
```

Trace while Loop, cont.

Print Welcome to Java

```
int count = 0;

while (count < 2) {

  System.out.println("Welcome to Java!");

  count++;

}
```

Trace while Loop, cont.

Increase count by 1
count is 2 now

```
int count = 0;

while (count < 2) {

    System.out.println("Welcome to Java!");

    count++;

}
```

Trace while Loop, cont.

(count < 2) is false since count is 2 now

```
int count = 0;

while (count < 2) {

  System.out.println("Welcome to Java!");

  count++;

}
```

Trace while Loop

The loop exits. Execute the next statement after the loop.

```
int count = 0;

while (count < 2) {

  System.out.println("Welcome to Java!"):

  count++;

}
```

Implementasi

```java
public class LoopWhileMain {
    public static void main(String[] args) {
        int data, count;
        System.out.print("Masukkan banyak perulangan : ");
        Scanner Input = new Scanner(System.in);
        data = Input.nextInt();

        count = 0;
        while (count<data){
            System.out.println("Belajar Java broo...");
            count++;
        }
    }
}
```
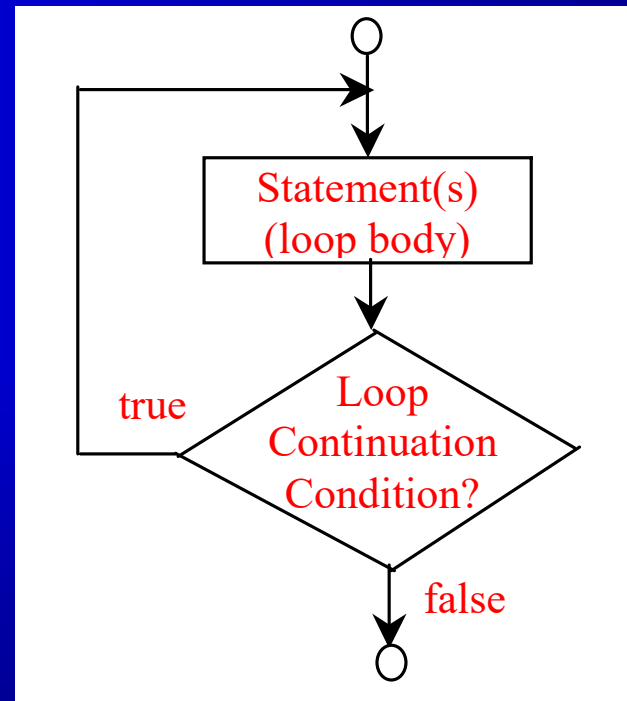
myprojecttest.LoopWhileMain

Output - myProjectTest (run) ×

```
Masukkan banyak perulangan : 3
Belajar Java broo...
Belajar Java broo...
Belajar Java broo...
BUILD SUCCESSFUL (total time: 3 seconds)
```

do-while Loop


```
do {

    // Loop body;

    Statement(s);

} while (loop-continuation-condition);
```

Implementasi

```java
public static void main(String[] args) {
    int data,count;
    System.out.print("Masukkan banyak perulangan : ");
    Scanner Input = new Scanner(System.in);
    data = Input.nextInt();
    count = 0;
    do {
        System.out.println("Belajar Java broo...");
        count++;
    } while (count<data);
}
}
```

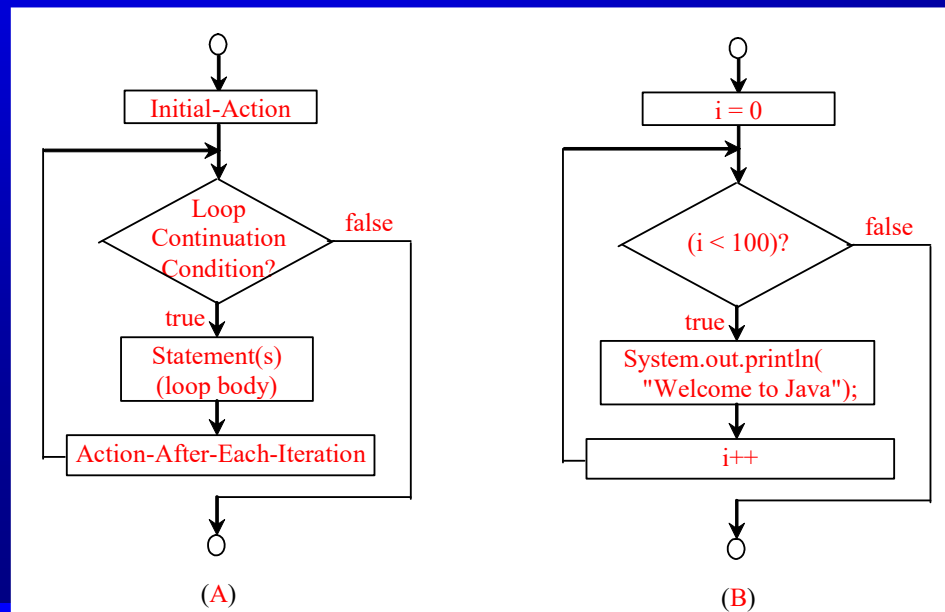myprojecttest.DoWhileLoopMain > main > Input

tput - myProjectTest (run) ×

```
run:
Masukkan banyak perulangan : 2
Belajar Java broo...
Belajar Java broo...
BUILD SUCCESSFUL (total time: 3 seconds)
```

`for` Loops

```
for (initial-action; loop-
    continuation-condition;
    action-after-each-iteration) {
  // loop body;
  Statement(s);
}
```

```
int i;
for (i = 0; i < 100; i++) {
  System.out.println(
    "Welcome to Java!");
}
```


(A)   (B)

Trace for Loop

Declare i

```
int i;
for (i = 0; i < 2; i++) {
  System.out.println(
    "Welcome to Java!");
}
```

Trace for Loop, cont.

Execute initializer
i is now 0

```
int i;
for (i = 0; i < 2; i++) {
  System.out.println(
    "Welcome to Java!");
}
```

Trace for Loop, cont.

```
int i;
for (i = 0; i < 2; i++) {
  System.out.println( "Welcome to Java!");
}
```

(i < 2) is true
since i is 0

Trace for Loop, cont.

Print Welcome to Java

```
int i;
for (i = 0; i < 2; i++) {
   System.out.println("Welcome to Java!");
}
```

Trace for Loop, cont.

Execute adjustment statement
i now is 1

```
int i;
for (i = 0; i < 2; i++) {
  System.out.println("Welcome to Java!");
}
```

Trace for Loop, cont.

(i < 2) is still true
since i is 1

```
int i;
for (i = 0; i < 2; i++) {
  System.out.println("Welcome to Java!");
}
```

Trace for Loop, cont.

Print Welcome to Java

```
int i;
for (i = 0; i < 2; i++) {
    System.out.println("Welcome to Java!");
}
```

Trace for Loop, cont.

Execute adjustment statement
i now is 2

```
int i;
for (i = 0; i < 2; i++) {
  System.out.println("Welcome to Java!");
}
```

Trace for Loop, cont.

(i < 2) is false
since i is 2

```
int i;
for (i = 0; i < 2; i++) {
  System.out.println("Welcome to Java!");
}
```

Trace for Loop, cont.

Exit the loop. Execute the next statement after the loop

```
int i;
for (i = 0; i < 2; i++) {
  System.out.println("Welcome to Java");
}
```

Implementasi

```
10    public class FoorLoopMain {
11
12        public static void main(String[] args) {
13            int data, count;
14            System.out.print("Masukkan banyak perulangan (for loop) : ");
15            Scanner Input = new Scanner(System.in);
16            data = Input.nextInt();
17
18            for (count=0; count<data; count++){
19                System.out.println("Belajar Java broo...");
20            }
21        }
22    }
```

myprojecttest.FoorLoopMain > ⓘ main > count >

Output - myProjectTest (run) ×

```
run:
Masukkan banyak perulangan (for loop) : 2
Belajar Java broo...
Belajar Java broo...
BUILD SUCCESSFUL (total time: 3 seconds)
```

METHOD

Method

```java
public static void main(String[] args) {
    int ukuran1, ukuran2;
    int [] data1, data2, hasilJumlah;

    Scanner in = new Scanner(System.in);
    System.out.print("Masukan ukuran array : ");
    ukuran1 = in.nextInt();
    data1 = isiArray(ukuran1);
    bacaArray(data1);

    System.out.print("Masukan ukuran array : ");
    ukuran2 = in.nextInt();
    data2 = isiArray(ukuran2);
    bacaArray(data2);

    hasilJumlah = jumlah(data1,data2);

    bacaArray(hasilJumlah);
}
```

```java
public static int[] isiArray(int ukuran){
    int [] kapling = new int[ukuran];
    Scanner in = new Scanner(System.in);
    for (int i=0; i<ukuran; i++){
        System.out.print("Masukan elemen ke "+i+" : ");
        kapling[i] = in.nextInt();
    }
    return kapling;
}


public static void bacaArray(int [] arrayku){
    System.out.println("=== Membaca isi array ===");
    for (int i=0; i<arrayku.length; i++){
        System.out.println("Elemen ke "+i+" : "+arrayku[i]);
    }
}
```

```java
public static int[] jumlah(int [] array1, int [] array2){
    int [] kapling = new int[array1.length];

    for (int i=0; i<array1.length; i++)
        kapling[i] = array1[i] + array2[i];
    return kapling;
}
```