

OOP Using JAVA

05 – Control Statements

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RECAP

- » Creating and running programs
- » Mathematical Routines
- » Identifiers
- » Variables and Constants
- » How to declare variables
- » Variable types
- » Data Inputs using *Keyin*

AGENDA

- Relational Operators
- Logical Operators
- If statements
- If – else statements
- Else – if statements
- Switch statements
- Examples

Relational Operators

Standard algebraic equality or relational operator	Java equality or relational operator	Example of Java condition	Meaning of Java condition
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Equality operators

=

==

x == y

x is equal to **y**

≠

!=

x != y

x is not equal to **y**

Relational operators

>

>

x > y

x is greater than **y**

<

<

x < y

x is less than **y**

≥

>=

x >= y

x is greater than or equal to **y**

≤

<=

x <= y

x is less than or equal to **y**

Logical Operators

Java Logical Operators

OPERATOR	ACTION
&&	logical AND
	logical OR
!	logical NOT

Example

boolean result;

int a = 6;

int b = 2;

int c = 0;

result = a > b && c == 0; // Case 1 - result is true

result = a > b && c != 0; // Case 2 - result is false

result = a == 0 || c == 0; // Case 3 - result is true

if Statement

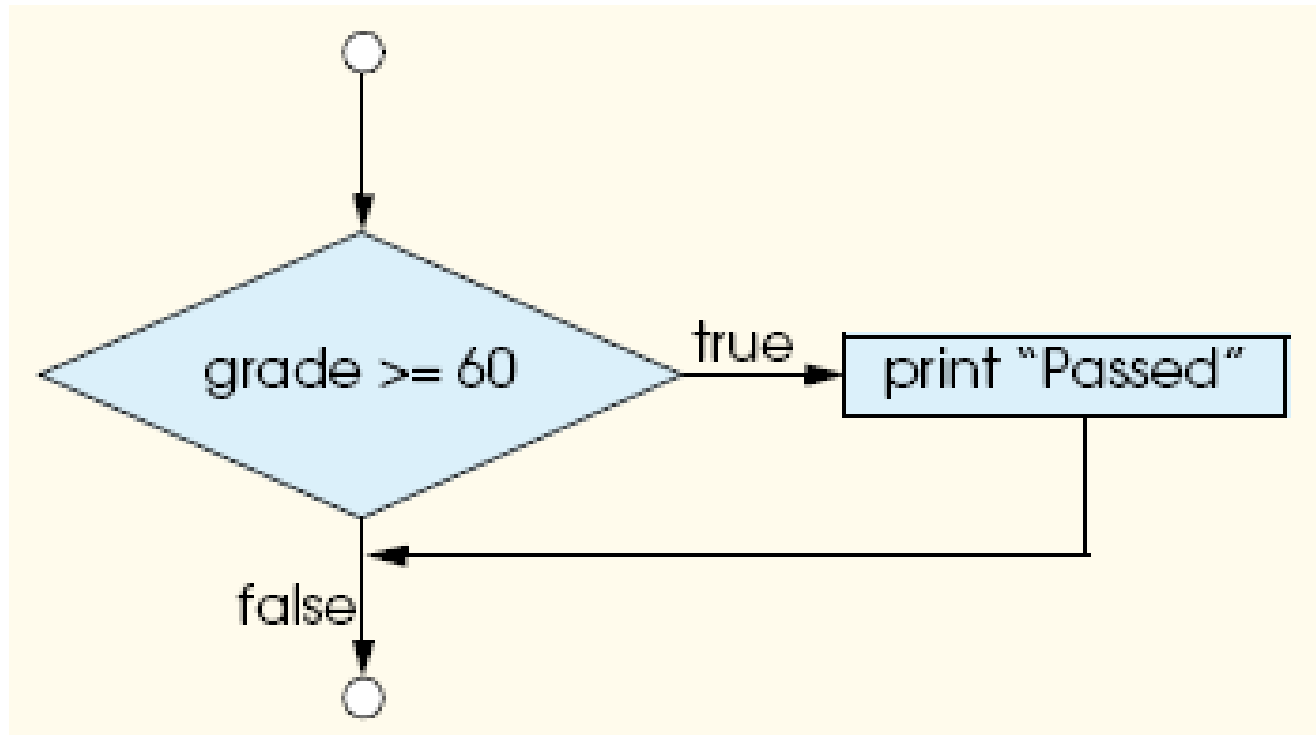
Pseudocode

*If student's grade is greater than or equal to 60
Print "Passed"*

Java statement

```
if ( studentGrade >= 60 )  
    System.out.println( "Passed" );
```

Flowchart



if - else

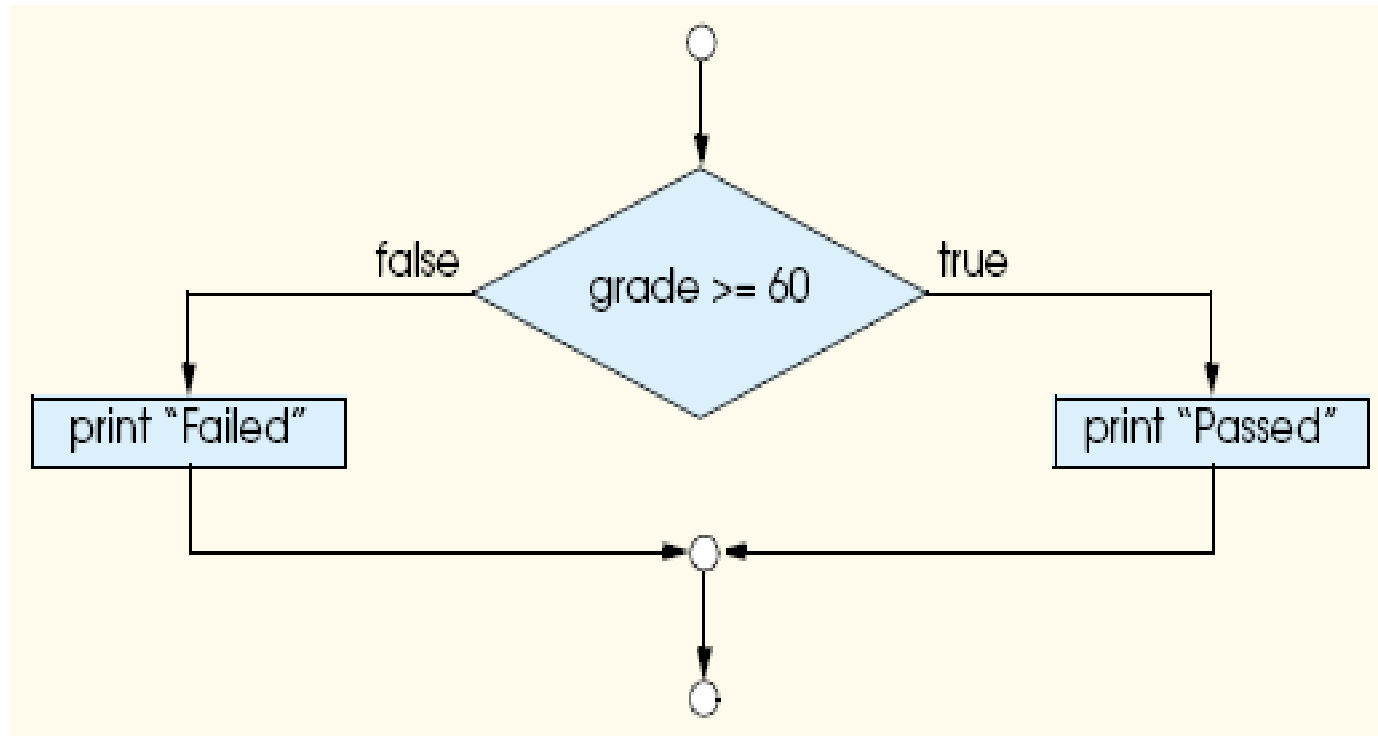
Pseudocode

*If student's grade is greater than or equal to 60
 Print "Passed"
else
 Print "Failed"*

Java

```
if ( studentGrade >= 60 )  
    System.out.println( "Passed" );  
else  
    System.out.println( "Failed" );
```

If-else flowchart



HINT:

*Indent both body statements
of an **if/else** structure*

Minimum using if-else

```
int a, b, min;
```

```
...
```

```
if (a < b)
```

```
    min = a;
```

```
else
```

```
    min = b;
```

Quiz

- » Write down the **pseudocode** statement that prints **A** for exam grades greater than or equal to 90, **B** for grades in the range 80 to 89, **C** for grades in the range 70 to 79, **D** for grades in the range 60 to 69 and **F** for all other grades:

Quiz - Ans

If student's grade is greater than or equal to 90

Print "A"

else

If student's grade is greater than or equal to 80

Print "B"

else

If student's grade is greater than or equal to 70

Print "C"

else

If student's grade is greater than or equal to 60

Print "D"

else

Print "F"

Java Ans.

```
if ( studentGrade >= 90 )
    System.out.println( "A" );
else
    if ( studentGrade >= 80 )
        System.out.println( "B" );
    else
        if ( studentGrade >= 70 )
            System.out.println( "C" );
        else
            if ( studentGrade >= 60 )
                System.out.println( "D" );
            else
                System.out.println( "F" );
```

```
if ( grade >= 90 )
    System.out.println( "A" );
else if ( grade >= 80 )
    System.out.println( "B" );
else if ( grade >= 70 )
    System.out.println( "C" );
else if ( grade >= 60 )
    System.out.println( "D" );
else
    System.out.println( "F" );
```

Think

```
if ( x > 5 )
```

```
    if ( y > 5 )
```

```
        System.out.println( "x and y are > 5" );
```

```
else
```

```
    System.out.println( "x is <= 5" );
```

HINT

*An **else** statement is paired with the closest if without an else located in the same block*

Switch Statement

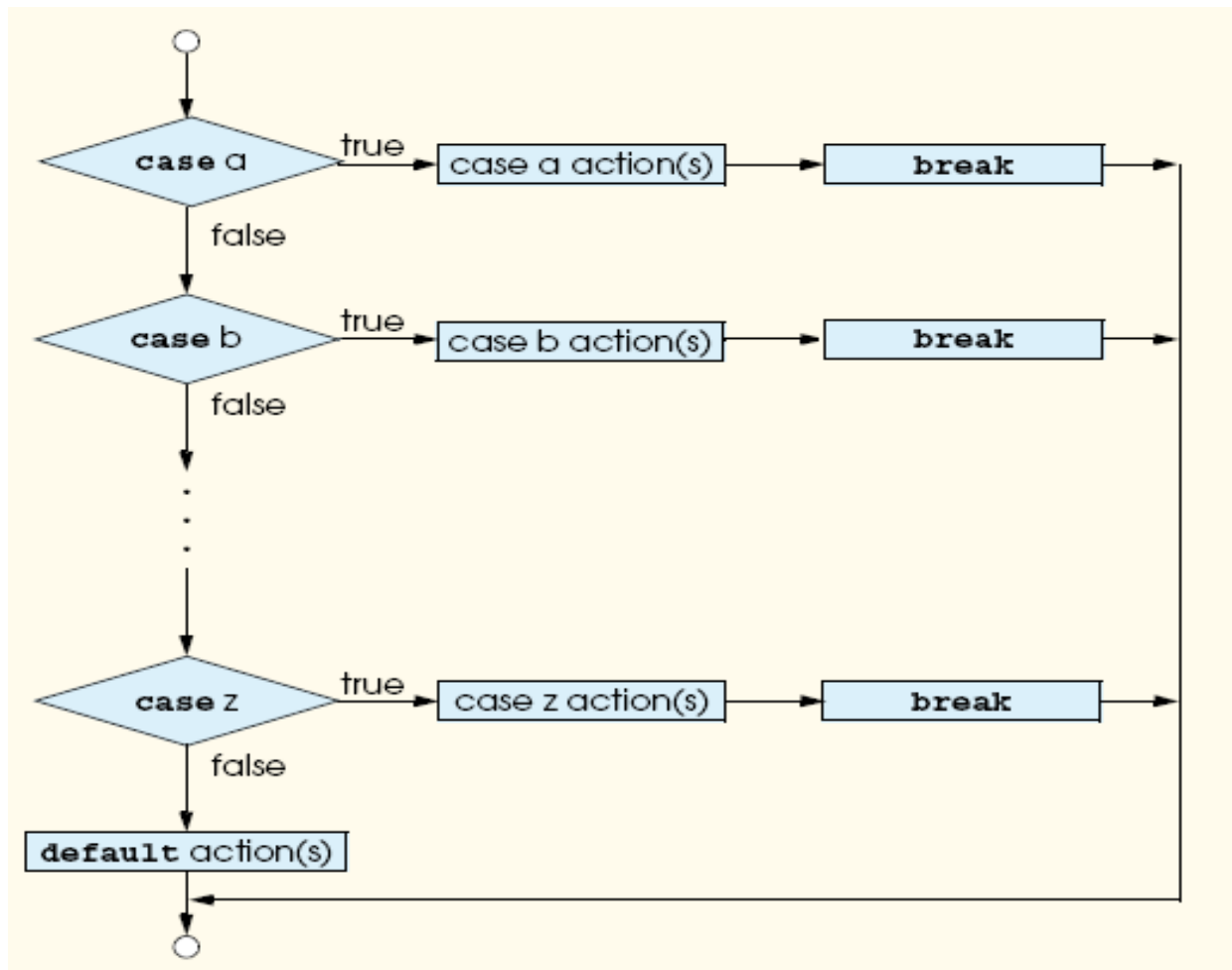
The switch consists of the following elements:

- » The *switch* keyword
- » A *controlling expression* enclosed in parentheses. Must be of *integer* type.
- » One or more *case* statements followed by an integer or character constant, or an expression that evaluates to a constant. Each case statement terminates in a *colon* symbol.
- » An optional *break* statement at the end of each case block. When the break is encountered, all other case statements are skipped.
- » An optional *default* statement. The default case receives control if none of the other case statements have executed.

Switch

```
switch (expression)
{
    case value1:
        statement;
        statement;
        ...
        [break;]
    case value2:
        statement;
        statement;
        ...
        [break;]
    ...
    [default:]
        statement;
        statement;
        ...
        [break;]
}
```

Switch Flowchart



Some code

```
char charVar;  
. . .  
switch (charVar)  
{  
    case 'A':  
        System.out.println("Input was A");  
        break;  
    case 'B':  
        System.out.println("Input was B");  
        break;  
    . . .  
}
```

```
int intVar;  
. . .  
switch (intVar)  
{  
    case 1:  
        System.out.println("Input was 1");  
        break;  
    case 2:  
        System.out.println("Input was 2");  
        break;  
    . . .  
}
```

Some code

```
switch (grade) {  
    case 'A':  
        System.out.println("Great job!");  
        break;  
    case 'B':  
        System.out.println("Good job!");  
        break;  
    case 'C':  
        System.out.println("You can do better!");  
        break;  
    default:  
        System.out.println("Consider cheating!");  
}
```

Think

```
switch (x) {  
    case 2:  
    case 4:  
    case 6:  
    case 8:  
        System.out.println("x is an even number");  
        break;  
    default: System.out.println("x is an odd number");  
}
```

Homework

- Read my book (chapter 5) - page 115
- Read page 135 “menuDemo” example
- Write down a program to calculate the roots of quadratic equation $ax^2 + bx + c = 0$