SE103 Programming Logic Thinking

Operator

Agenda

- Precedence
- Arithmetic Operator
- Logical Operator
- Relational Operator

What is the result?

```
x = 7 + 3 * 6
```

a) x=10*6

=60

b) x=7+18

=25

Precedence

- The priority of calculation

- Order to do calculation

Order	Operators	Order of evaluation
1	( )	Deeper first Left to right
2	*, / , modulus	Left to right
3	+, –	Left to right

Precedence

- You have to complete from the highest priority to the lowest priority.
- One level of priority at a time
- Only when all of the operator of a level priority is completely evaluated, we move to the next lower level.

$$(1+(1+3)-4)+2-(1+5)$$

$$(1+4-4)+2-(1+5)$$

$$1+2-(1+5)$$

$$1+2-6$$

$$3-6$$

$$-3$$

4−3*(4−2*(6−3))/2

4−3*(4−2*3)/2

4−3*(4−6)/2

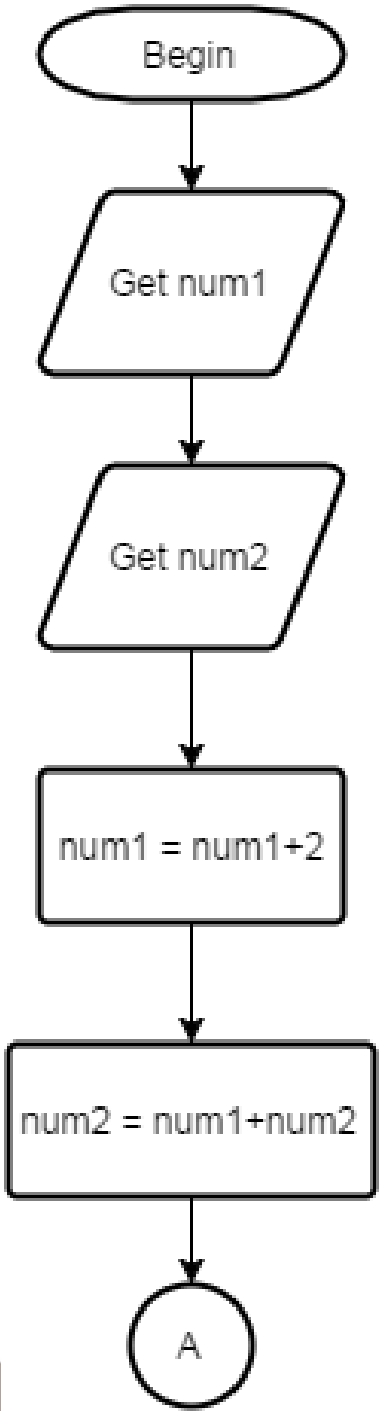
4−3*(−2)/2

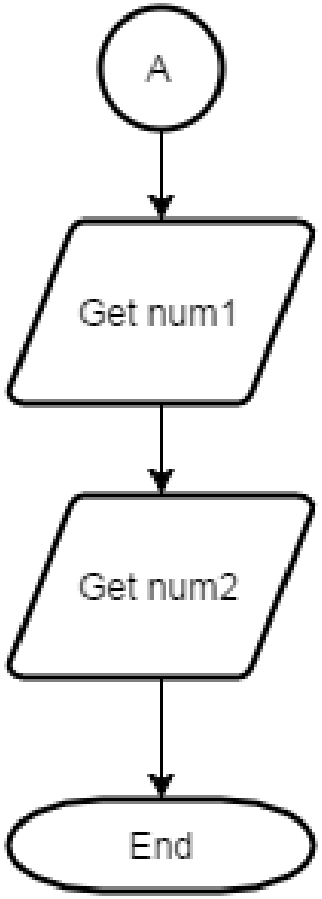
4−(−6)/2

4−(−3)

7

Operators and Sequential Programming

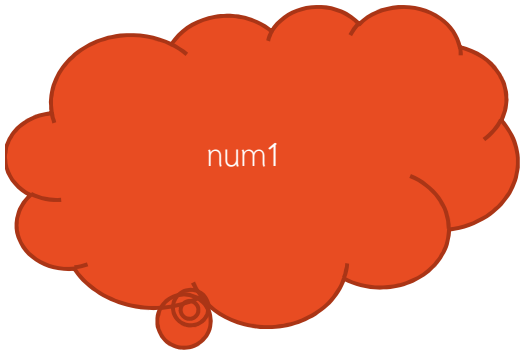


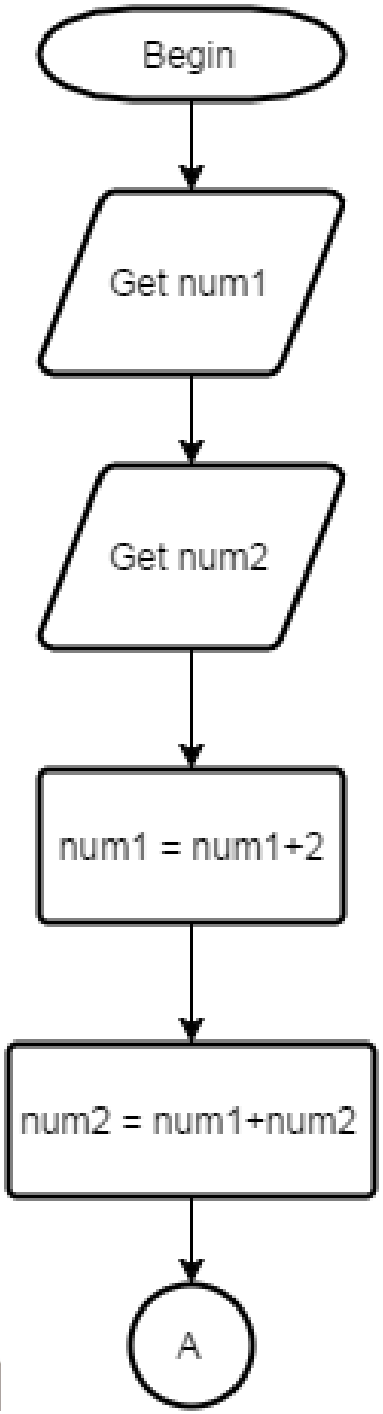


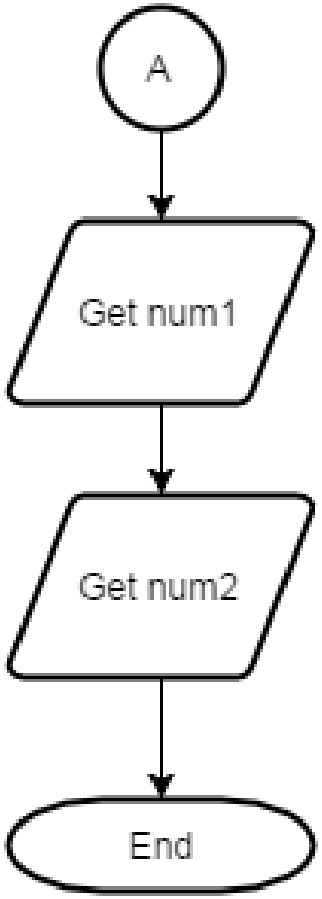
Operation and Sequential Programming

- The set of declared variable

- Move along the flow and perform the defined operation







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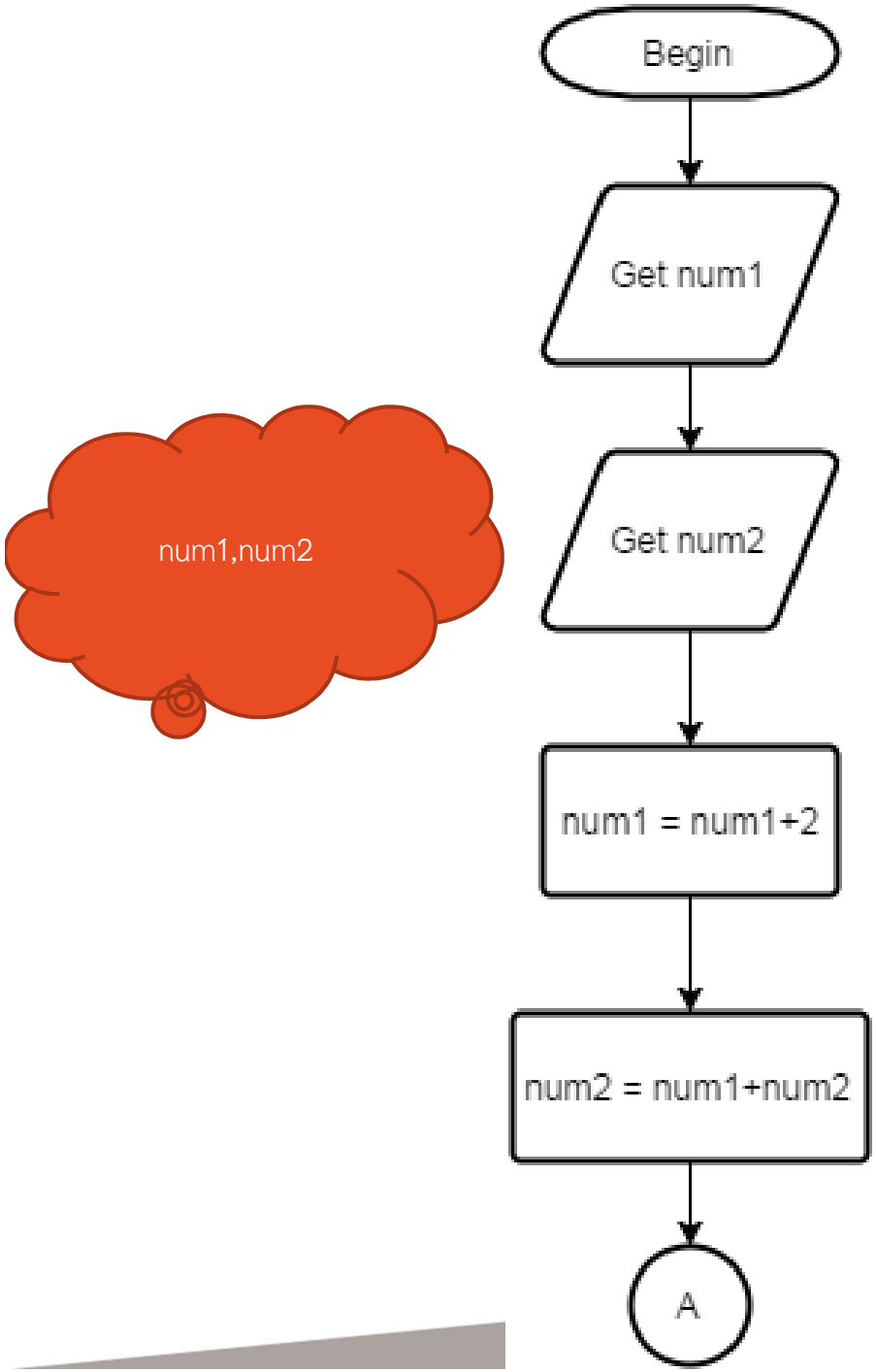
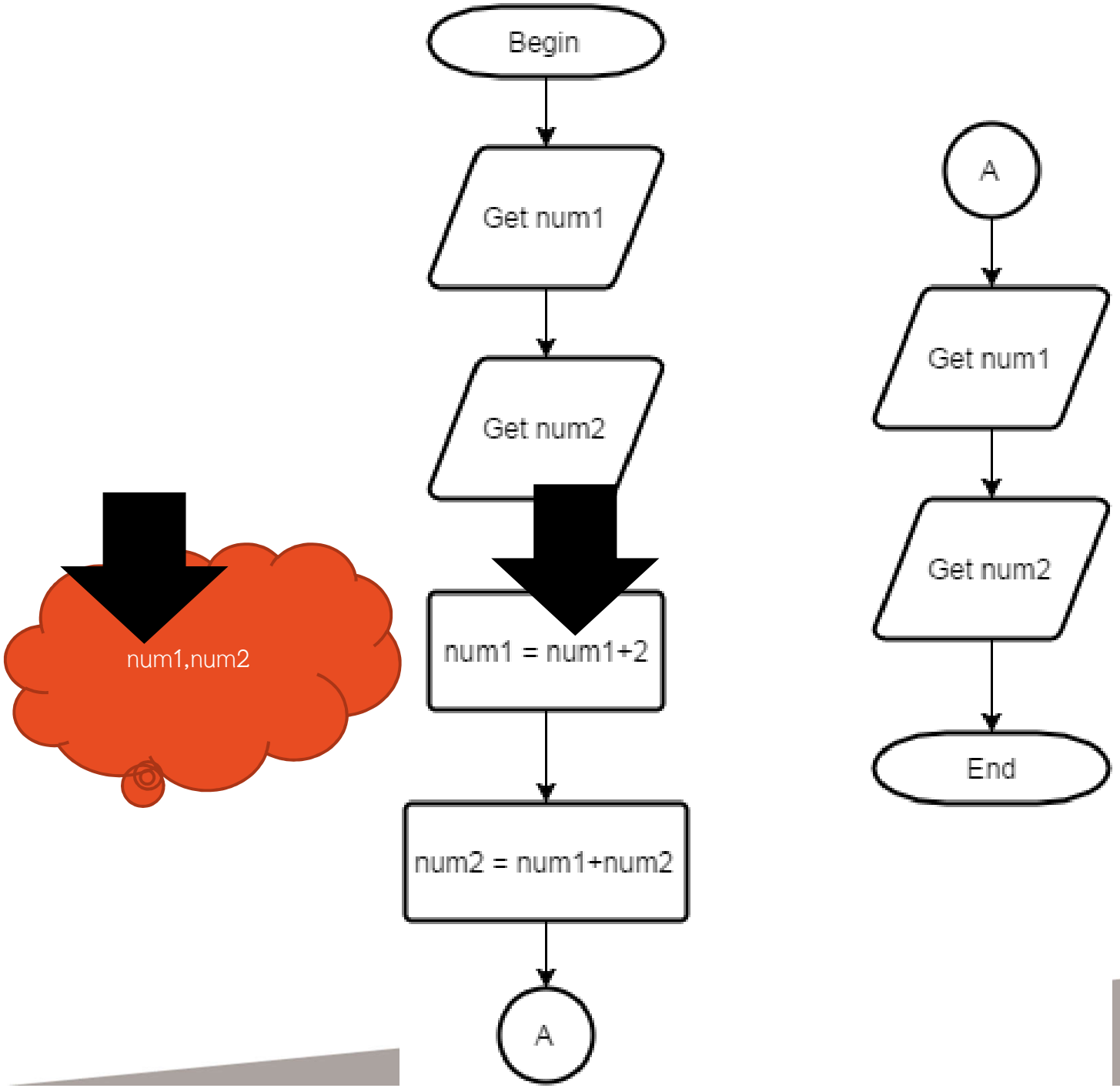

Begin
Get num1
Get num2
num1,num2
num1 = num1+2
num2 = num1+num2
A
A
Get num1
Get num2
End



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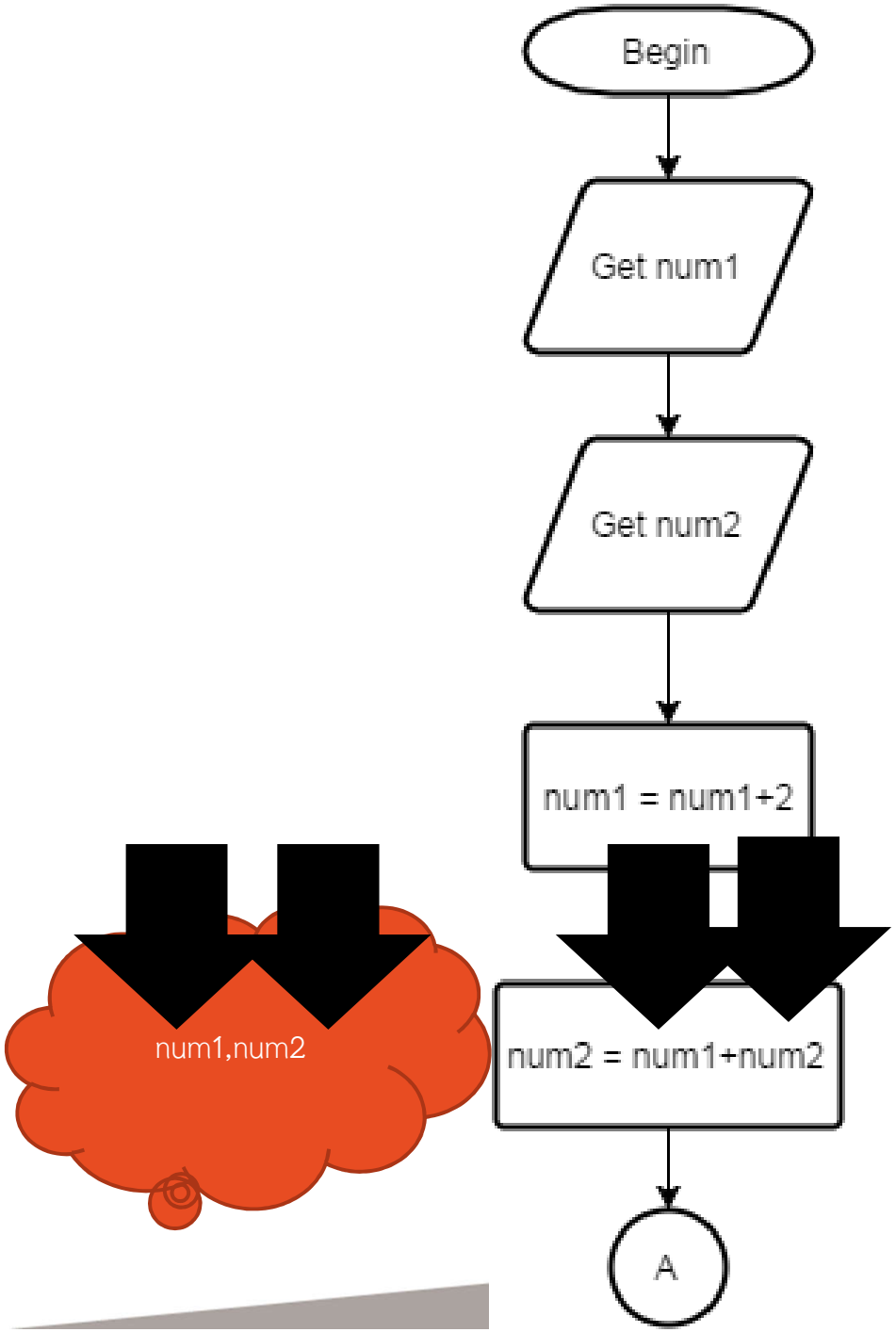

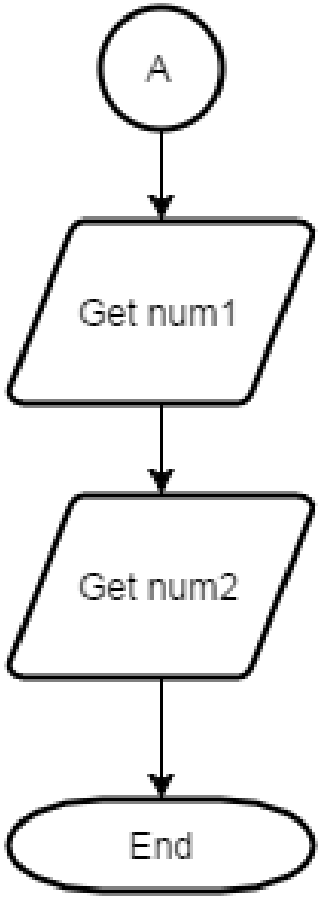

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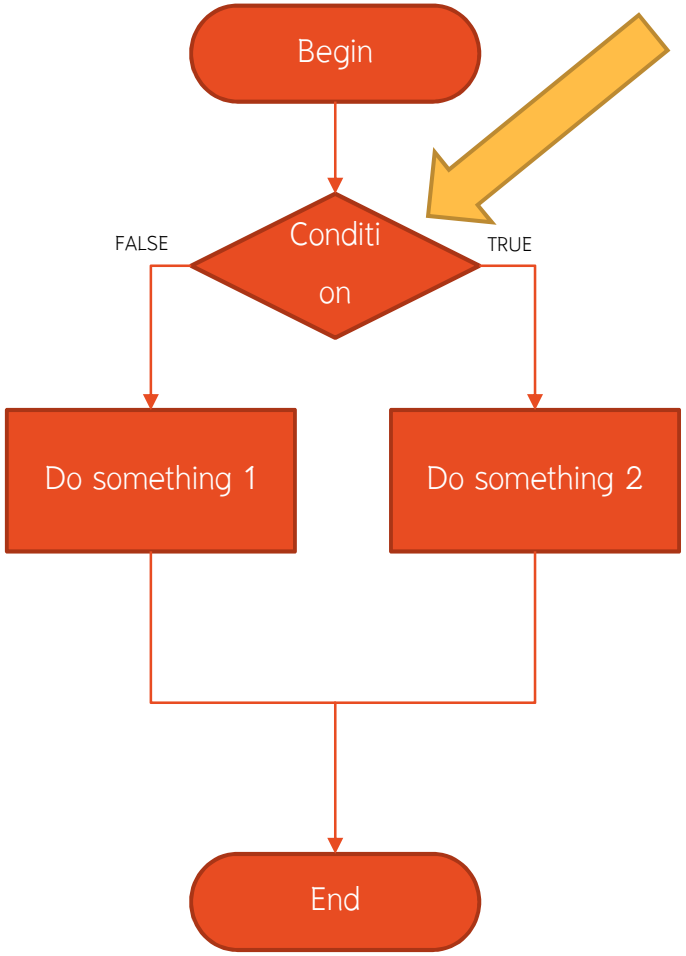
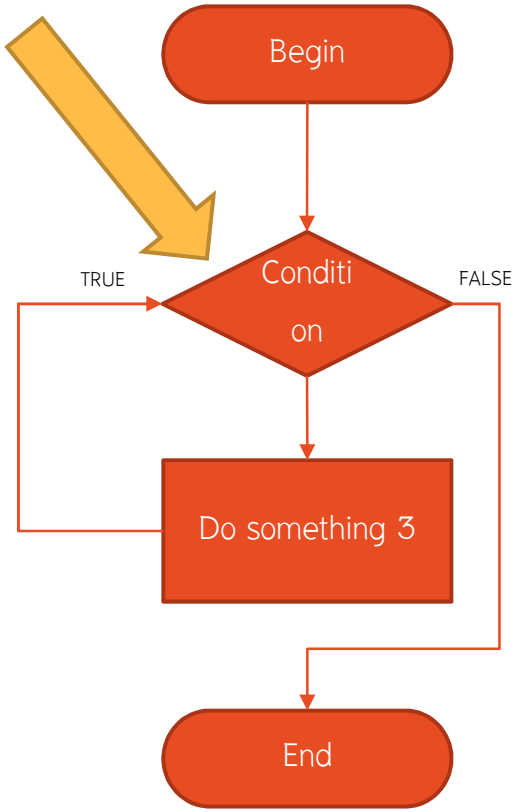
SE103 Programming
Logic Thinking

Relational Operator and Logical Operator



Selection structure



Repetition structure

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Condition

- Boolean value
  - TRUE
  - FALSE

- You cannot use the other data type to be a Boolean vale.

- You need to create a open statement to used as a condition.

Open statement

- The open statement is :

  “a statement is open when it is unknown if it is TRUE or FLASE.”

- The unknown result value is a result of the presence of variables.

- The truth value is unknown until the value is assigned to the variable.

Open statement

$X > 10$

 Statement

- If x is 11,
- The result is TRUE.

- If x is 9,
- The result is FALSE.

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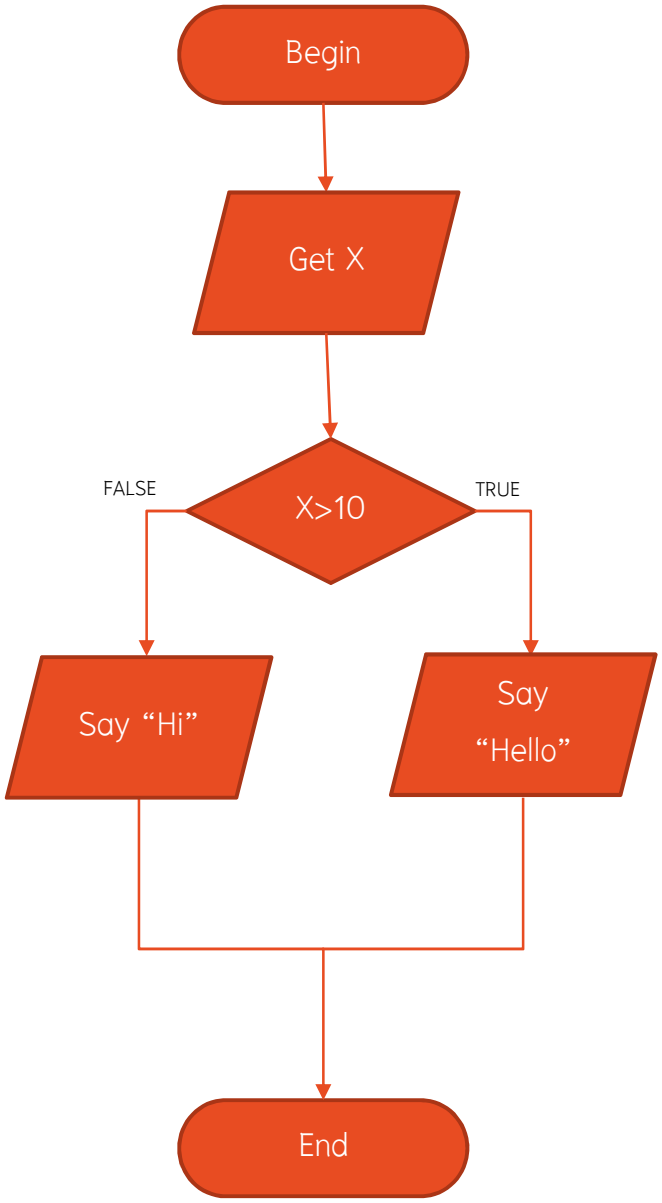
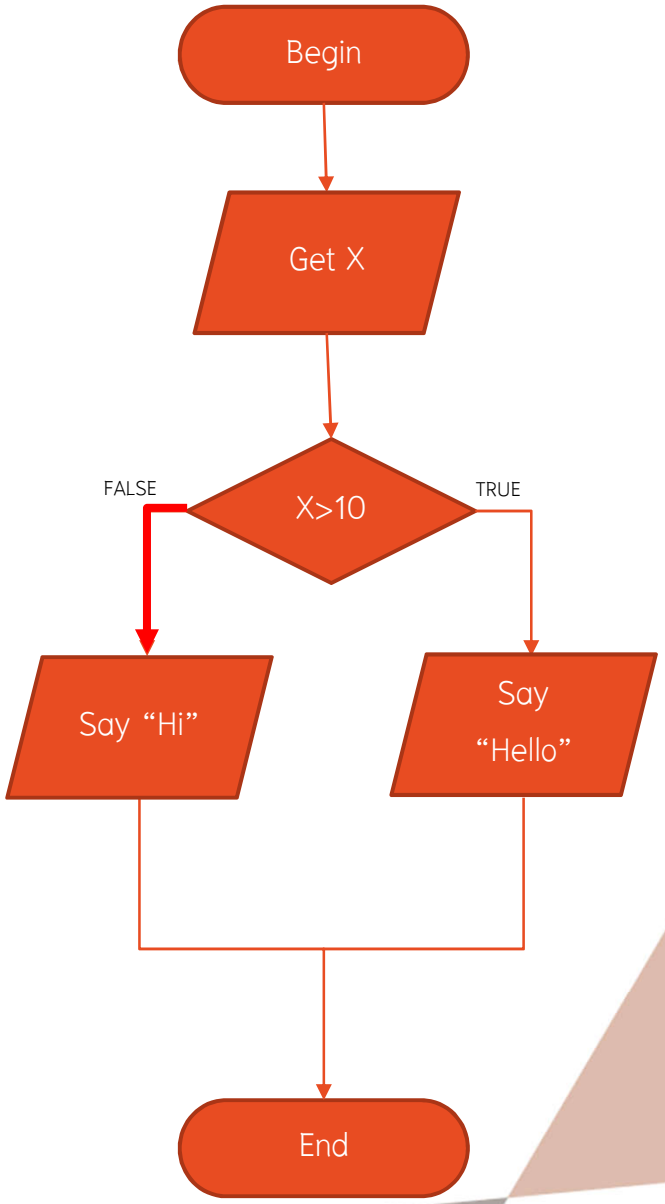

Begin
Get X
X>10
FALSE
TRUE
Say "Hi"
Say "Hello"
End

If user inputs 9

X>10 produces FALSE

Program says “Hi”



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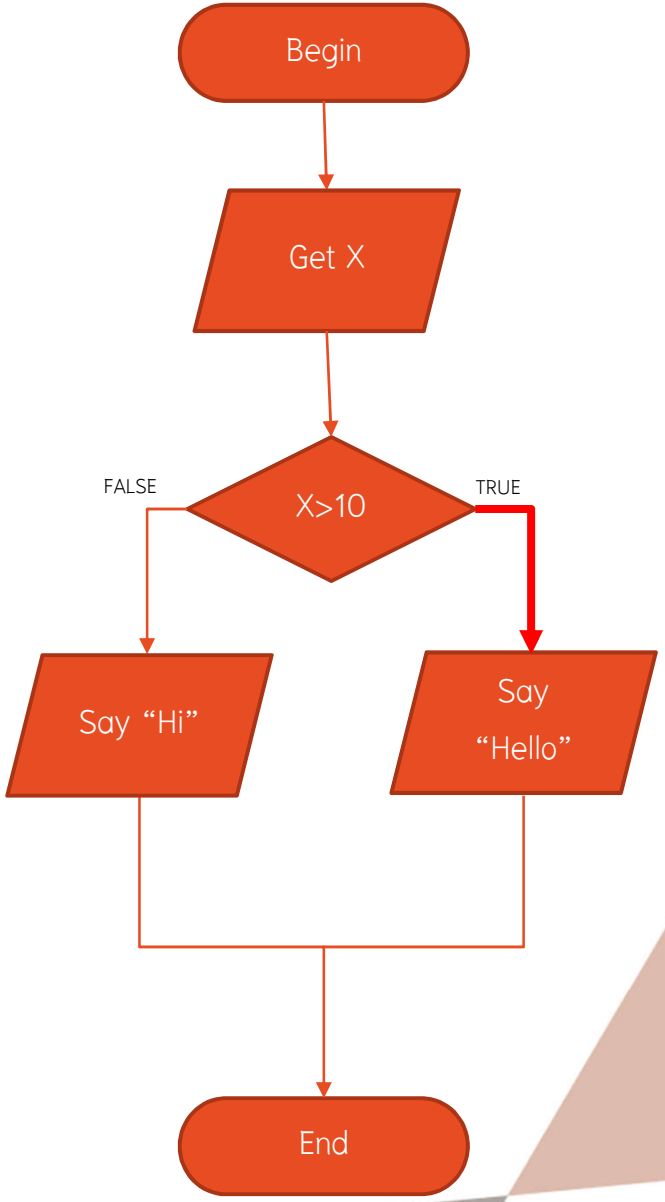
If user inputs 11

X>10 produces TRUE

Program says “Hello”



Statement

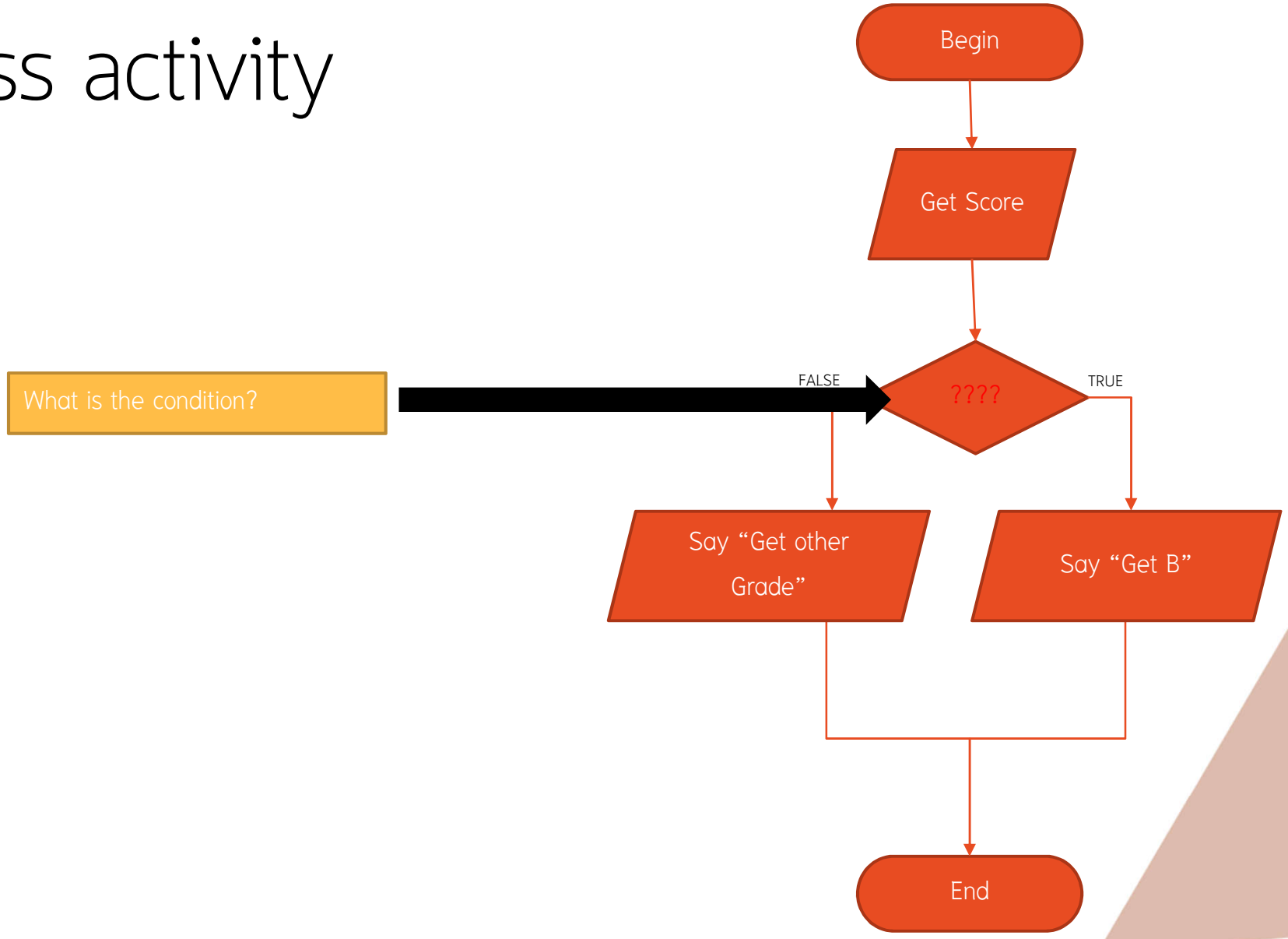
- Each data type has different operation
  - Just like the arithmetic operations.
- Binary operator
  - Always 2 operands
- The statement can be constructed by using:
  - Lesser than <
  - Lesser than or equal to ≤
  - Greater than >
  - Greater than or equal to ≥
  - Equal to ==
  - Not equal to ≠

Class activity

- Convert the following statement into flowchart.

"you will get B if you get score higher than 70 but lesser than 80. Otherwise, you will get other grade."

Class activity



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Class activity

- The condition can be broken down into 2 minor statements.

The score is higher than 70.

score >70

The score is lesser than 80.

score < 80

- Both of the statement must be true.

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Logical Operators

- A type of operator for logical value

- In most programming language, there are 3 logical operators :
  - Not operator
  - Or operator
  - And operator

Logical Operators : NOT

- Unary operator
- Convert the value into the opposite

NOT (operand)

Operand	Result
True	False
False	True

Logical Operators

- Binary operator
- In ALICE, it is referred as
  - EITHER operand1 OR operand2

operand1 **OR** operand2

Operand1	Operand2	Result
True	True	True
False	True	True
True	False	True
False	False	False

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Logical Operators

- Binary operator
- In ALICE, it is referred as
  - BOTH operand1 AND operand2

operand1 **AND** operand2

operand1	operand2	Result
True	True	True
False	True	False
True	False	False
False	False	False

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Mixed Precedence

Order	Operators	Order of evaluation
1	( )	Deeper first Left to right
2	NOT	Right to left
3	*, / , modulus	Left to right
4	+, –	Left to right
5	<, ≤, ≥ , >	Left to right
6	==, ≠	Left to right
7	AND	Left to right
8	OR	Left to right

(2+(1+(1+2)) > 4 and (2+2>3)

(2+(1+3)) > 4 and (2+2>3)

(2+4) > 4 and (2+2>3)

6 > 4 and (2+2>3)

6 > 4 and (4>3)

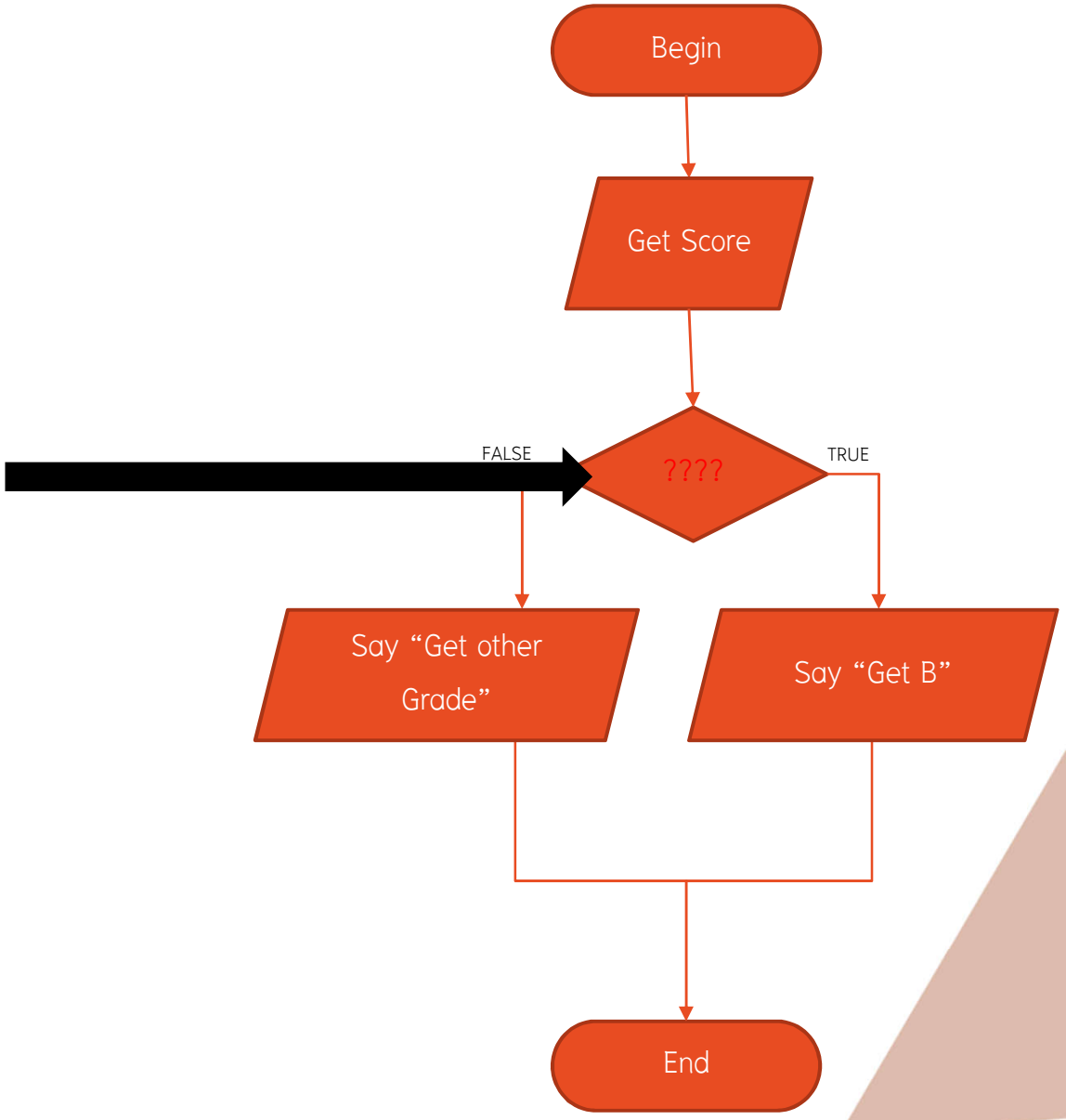
6 > 4 and true

True and true

True

Class activity

Score > 70 and Score < 80



Activity

- 5.0-3.0*2.0/4.0 > 2.0+3.0/2.0 OR 4.0<3.0 AND 1.0*2.0+3.0>4.0

- What is the result?

Q&A


THANK YOU FOR LISTENING.
WHO SAID HE DIDN'T LIKE MY PRESENTATION?
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