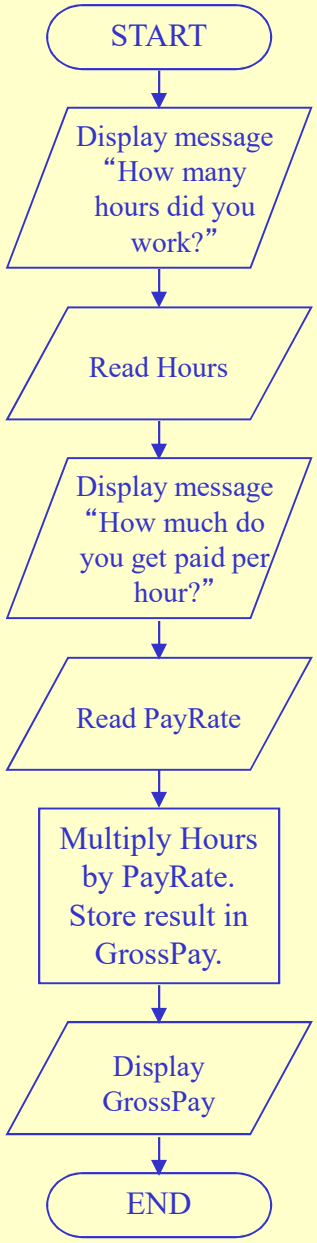
Introduction to Flowcharting

Taken from:
http://www.asfa.k12.al.us/ourpages/auto/2013/8/27/40649281/Flowcharting.ppt

What is a Flowchart?

- A flowchart is a diagram that depicts the "flow" of a program.
- The figure shown here is a flowchart for the pay-calculating program shown in Program 1-1.

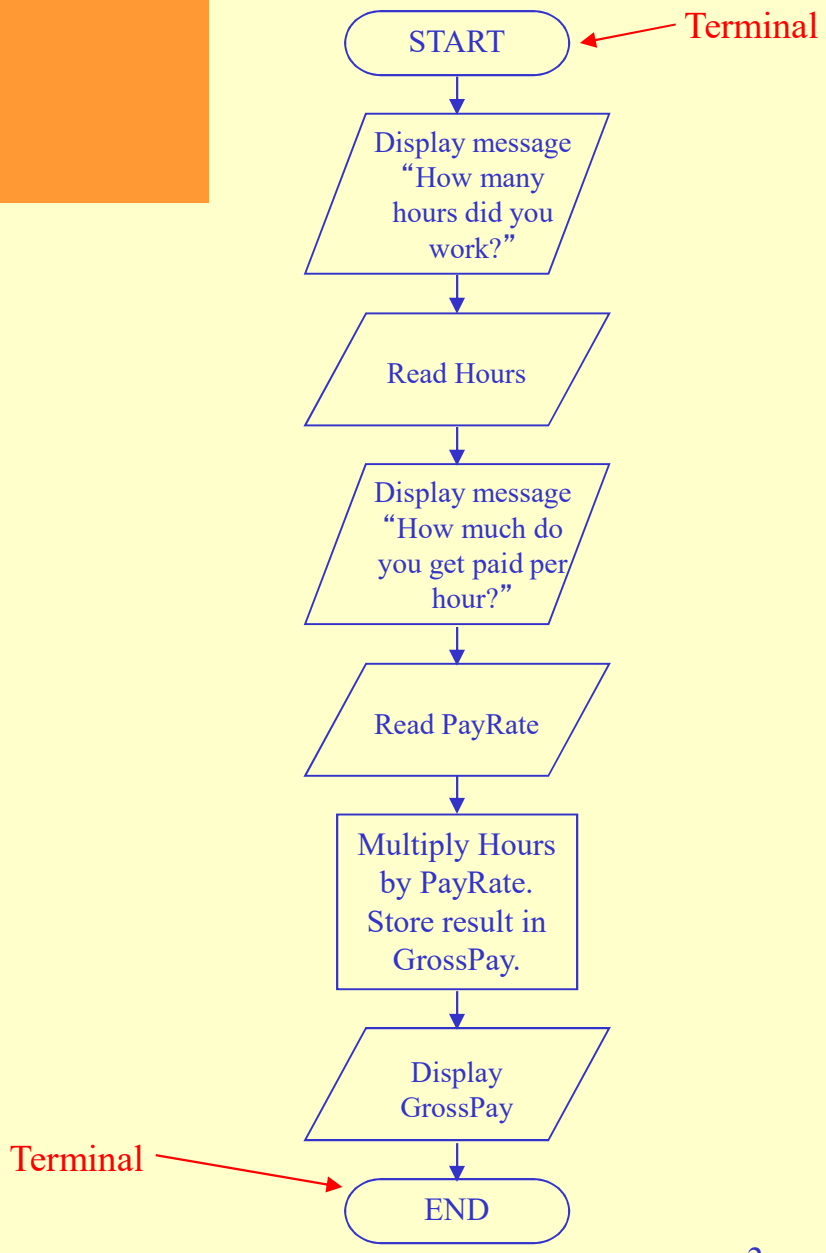


Basic Flowchart Symbols

- Terminals
  - represented by rounded rectangles
  - indicate a starting or ending point

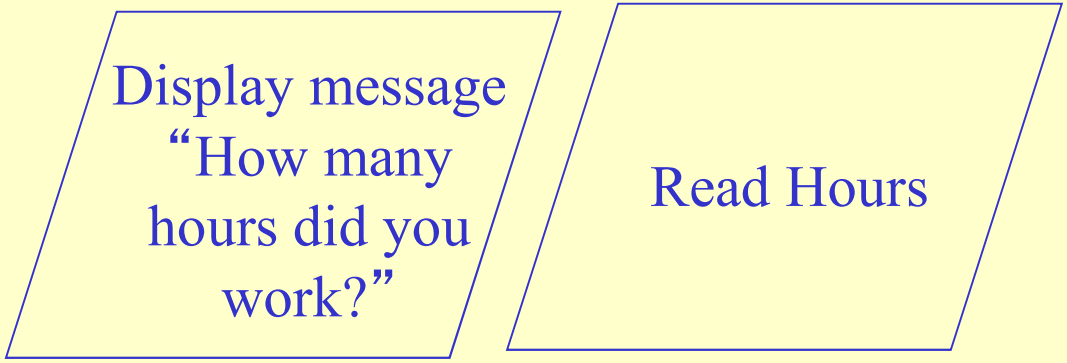
START

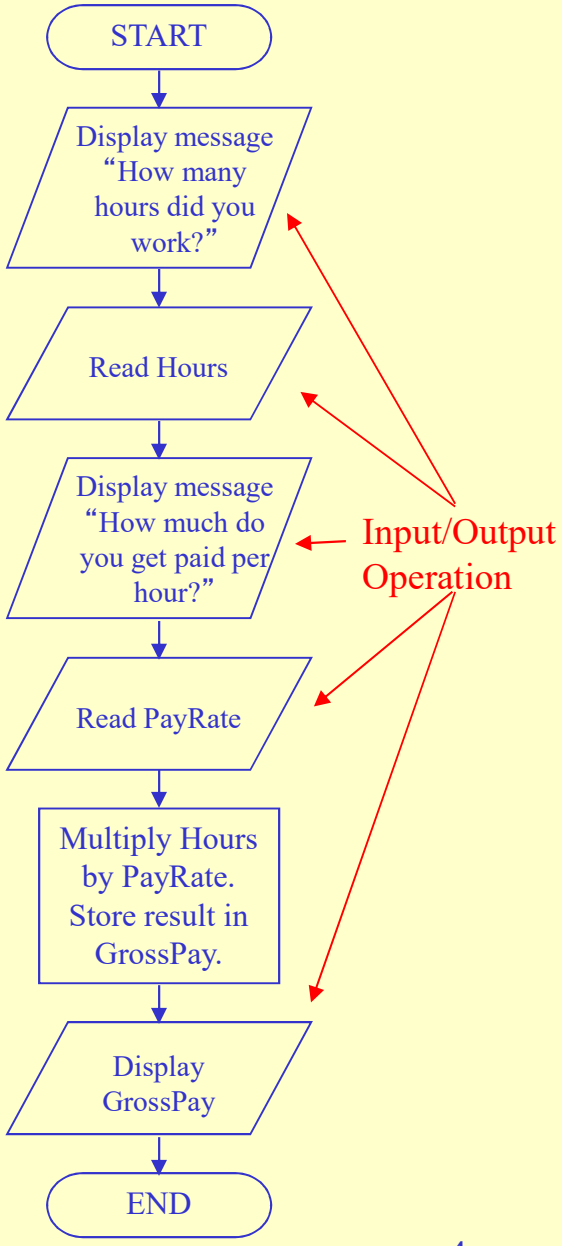
END



Basic Flowchart Symbols

- Input/Output Operations
  - represented by parallelograms
  - indicate an input or output operation

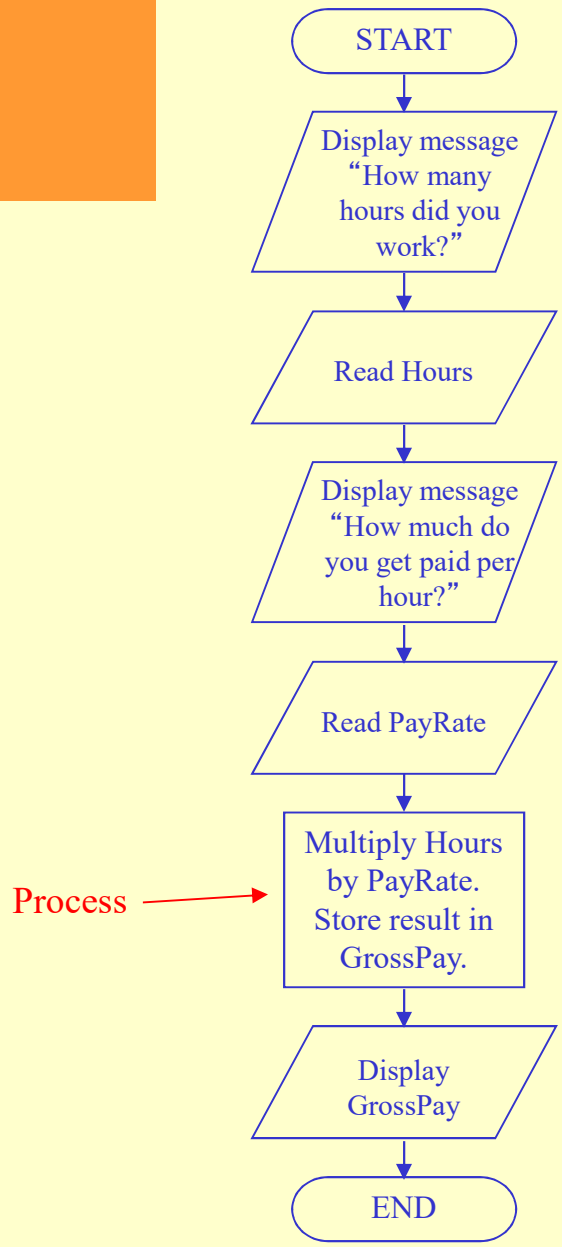




Basic Flowchart Symbols

- Processes
  - represented by rectangles
  - indicates a process such as a mathematical computation or variable assignment

Multiply Hours by PayRate. Store result in GrossPay.

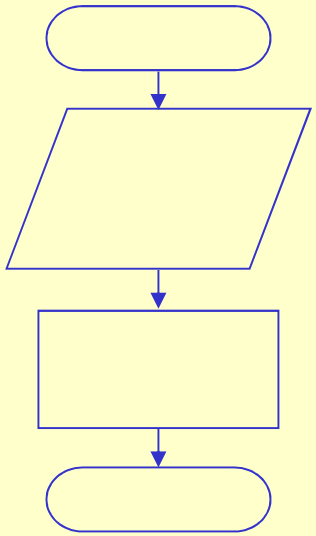


Four Flowchart Structures

- Sequence
- Decision
- Repetition
- Case

Sequence Structure

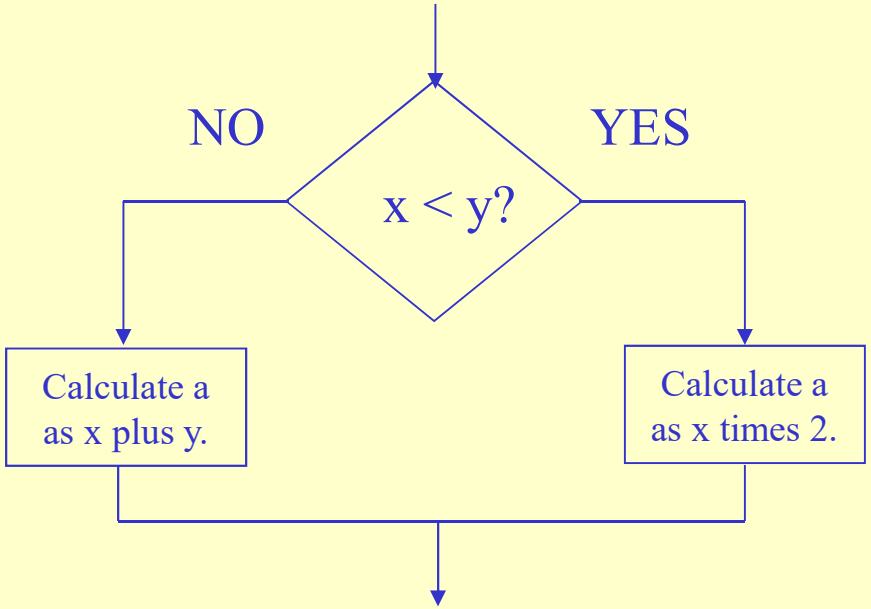
- A series of actions are performed in sequence
- The pay-calculating example was a sequence flowchart.



Decision Structure

- The flowchart segment below shows how a decision structure is expressed in C++ as an if/else statement.

Flowchart



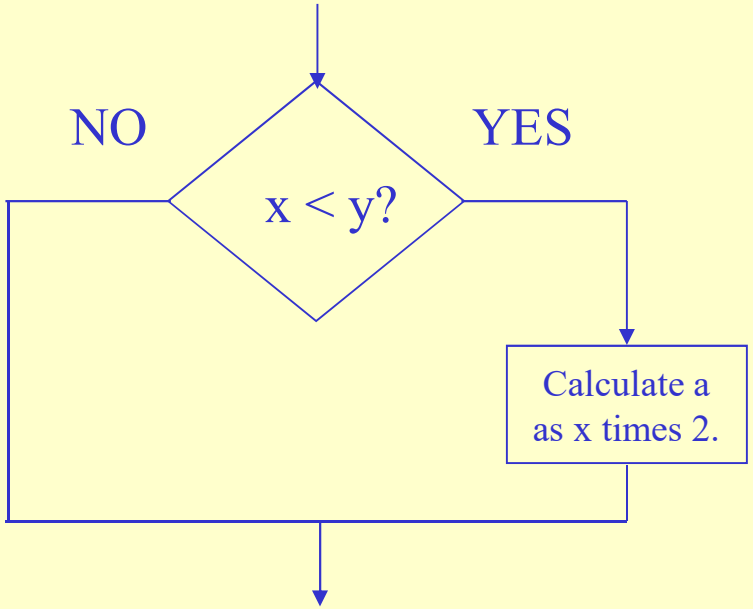
C++ Code

```
if (x < y)
   a = x * 2;
else
   a = x + y;
```

Decision Structure

- The flowchart segment below shows a decision structure with only one action to perform. It is expressed as an if statement in C++ code.

Flowchart



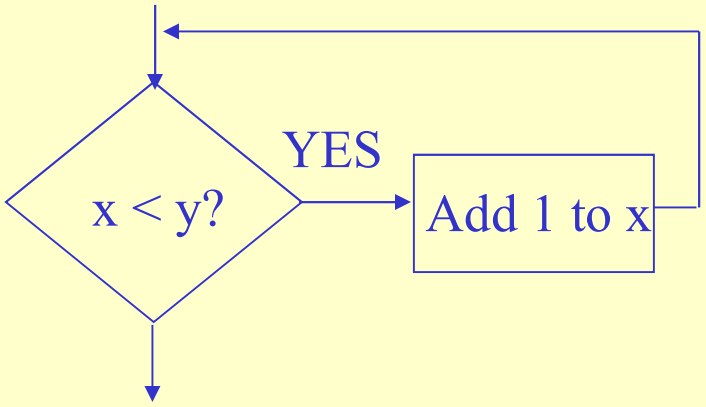
C++ Code

```
if (x < y)
    a = x * 2;
```

Repetition Structure

- The flowchart segment below shows a repetition structure expressed in C++ as a while loop.

Flowchart

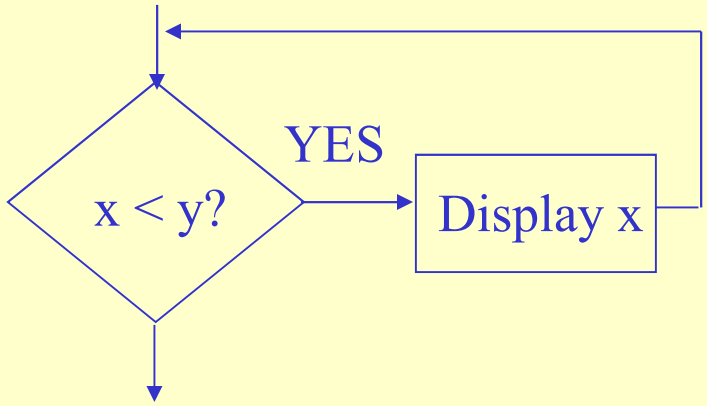


C++ Code

```
while (x < y)
    x++;
```

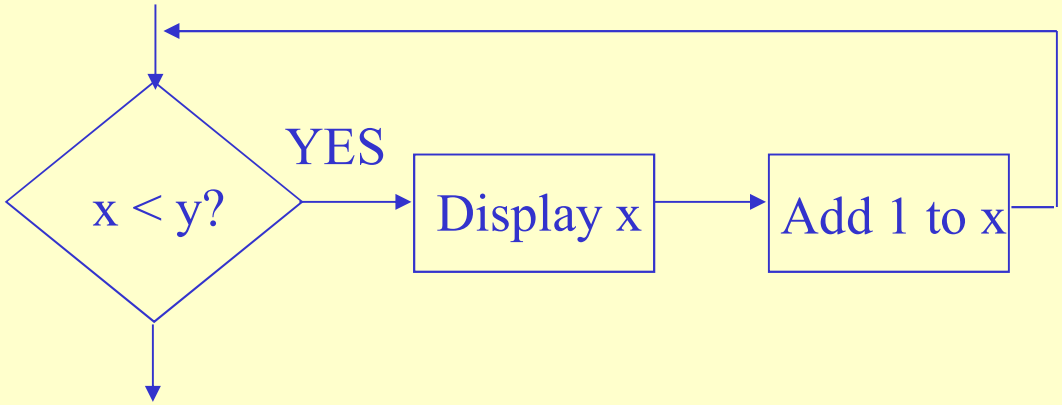
Controlling a Repetition Structure

- The action performed by a repetition structure must eventually cause the loop to terminate. Otherwise, an infinite loop is created.
- In this flowchart segment, x is never changed. Once the loop starts, it will never end.
- QUESTION: How can this flowchart be modified so it is no longer an infinite loop?

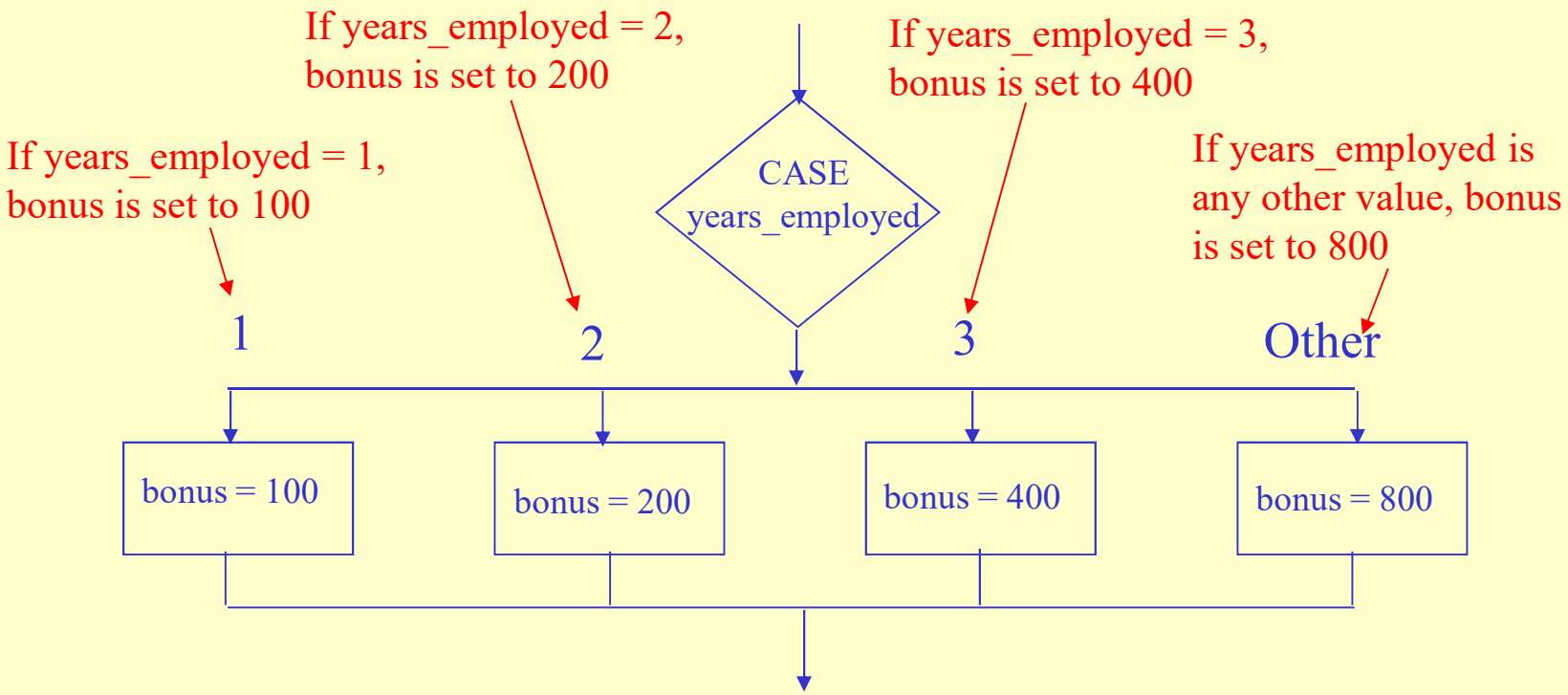


Controlling a Repetition Structure

- ANSWER: By adding an action within the repetition that changes the value of x.

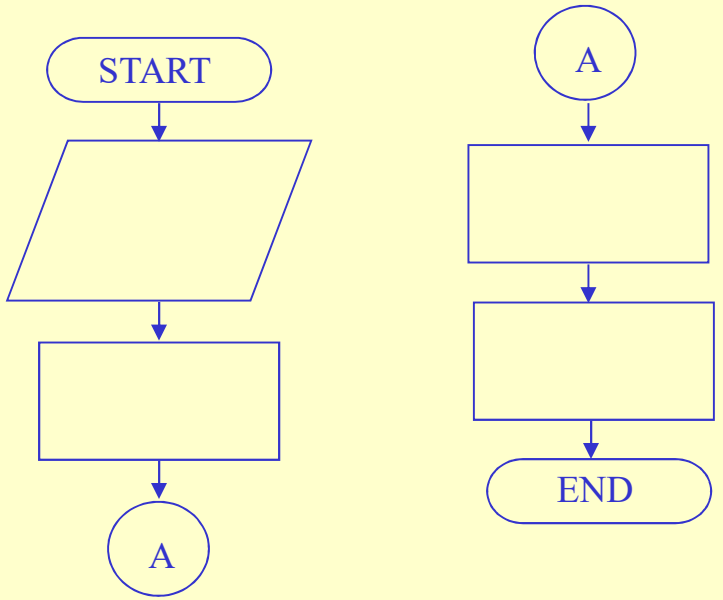


Case Structure



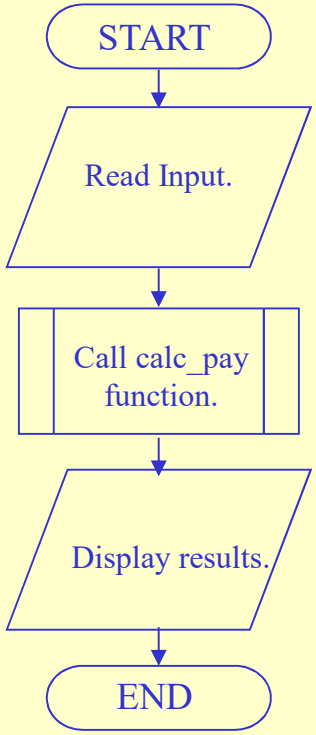
Connectors

•The “A” connector indicates that the second flowchart segment begins where the first segment ends.



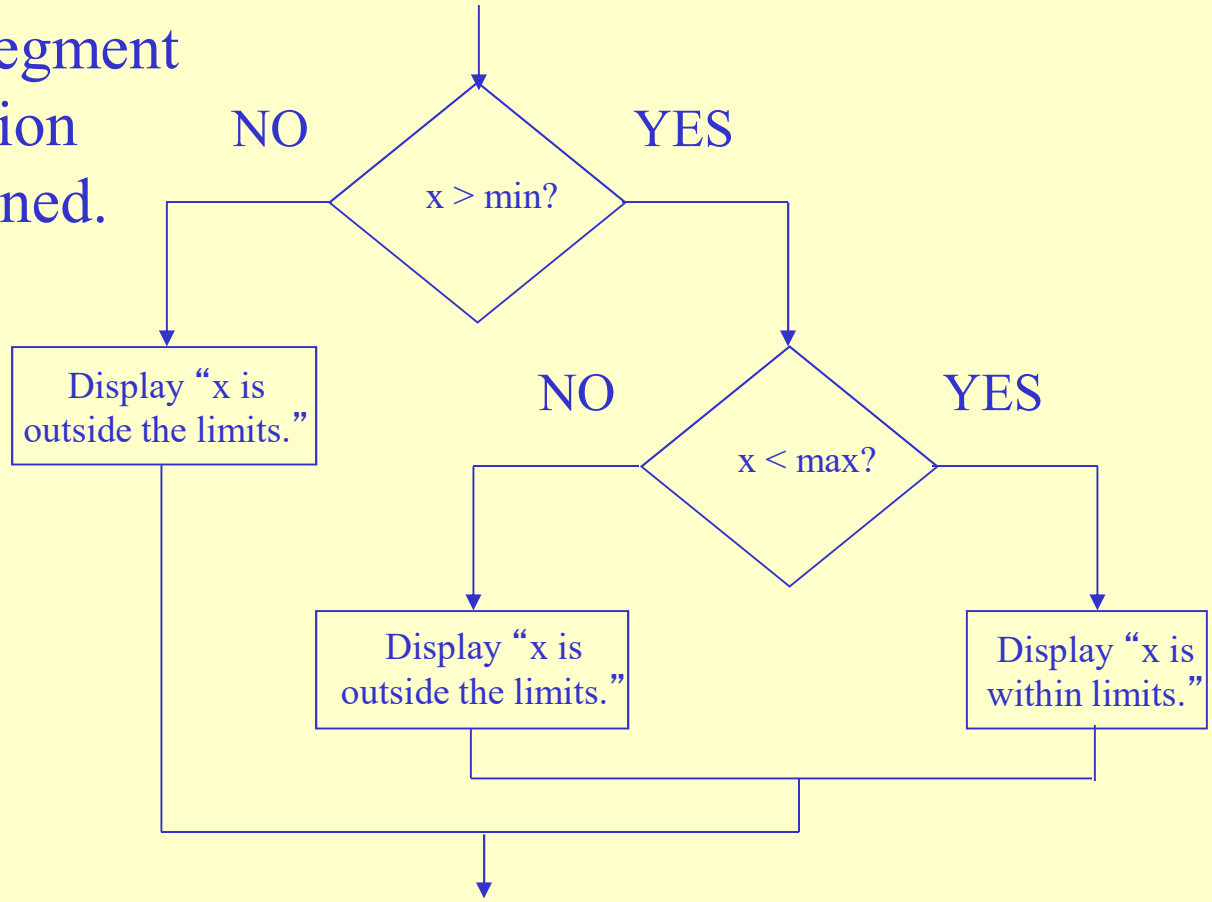
Modules

- The position of the module symbol indicates the point the module is executed.
- A separate flowchart can be constructed for the module.



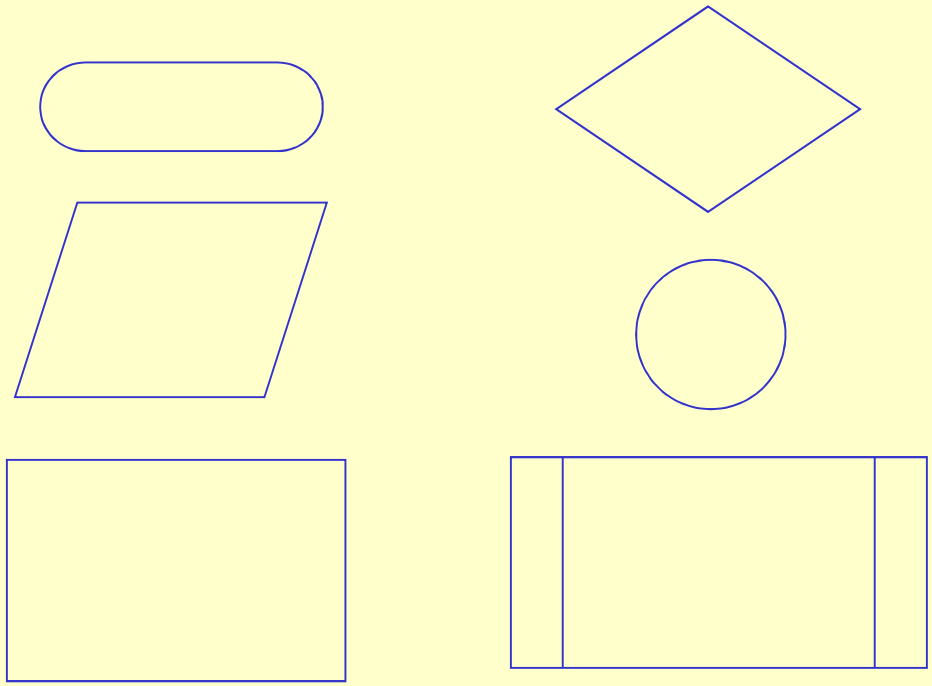
Combining Structures

- This flowchart segment shows two decision structures combined.



Review

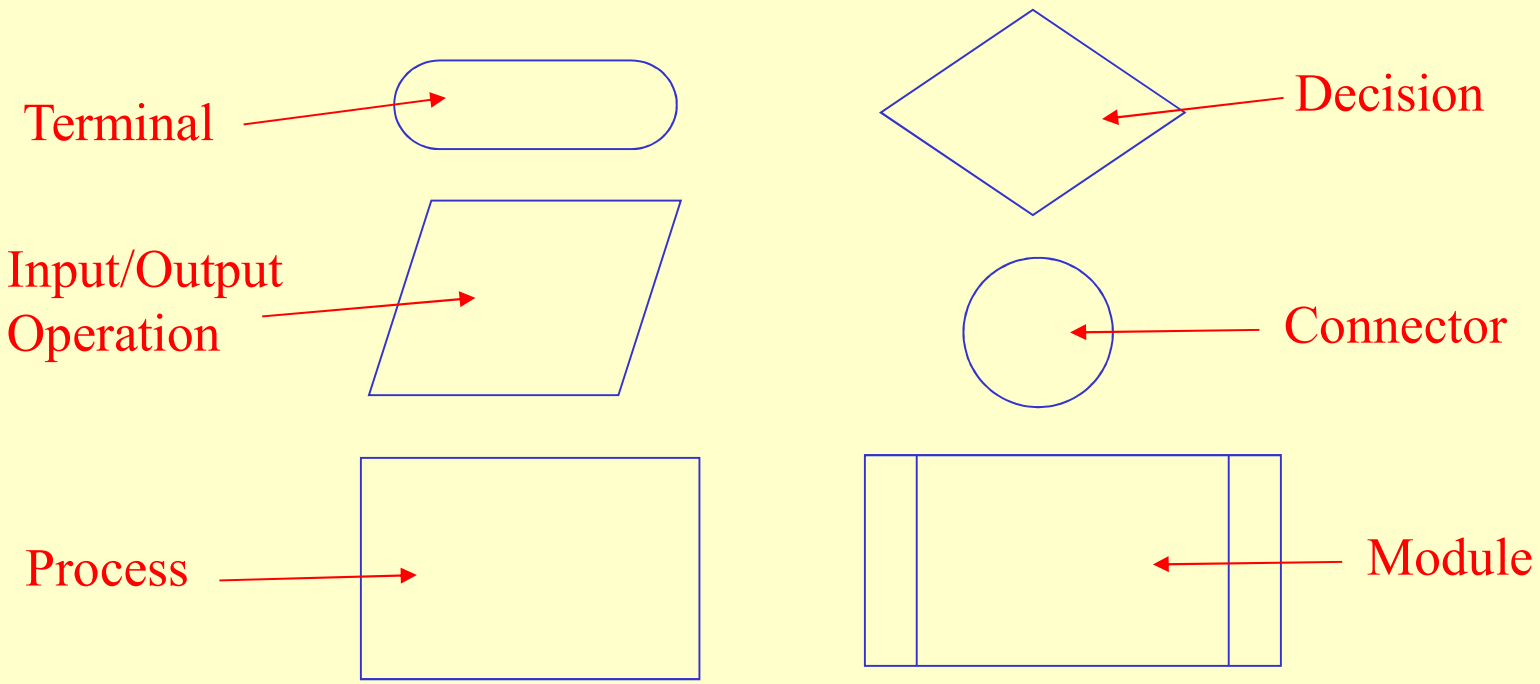
- What do each of the following symbols represent?



(Answer on next slide)

Answer

- What do each of the following symbols represent?



Review

- Name the four flowchart structures.

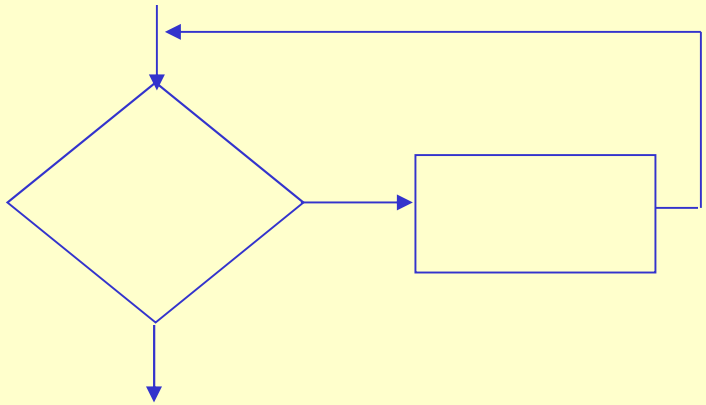
(Answer on next slide)

Answer

- Sequence
- Decision
- Repetition
- Case

Review

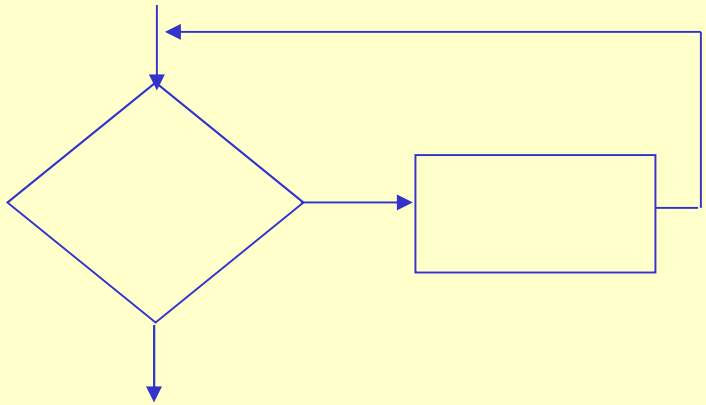
- What type of structure is this?



(Answer on next slide)

Answer

- Repetition



Review

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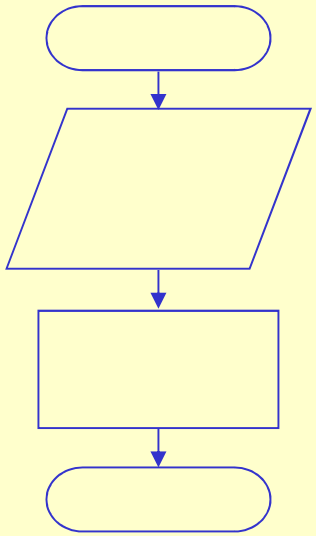

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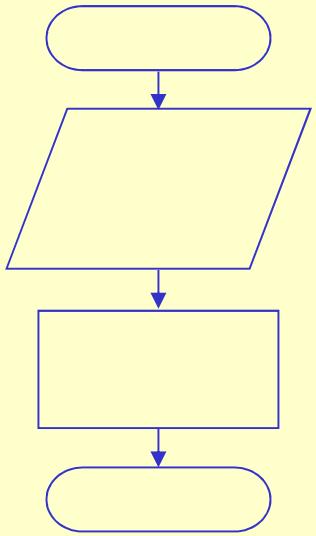
Answer

- Sequence



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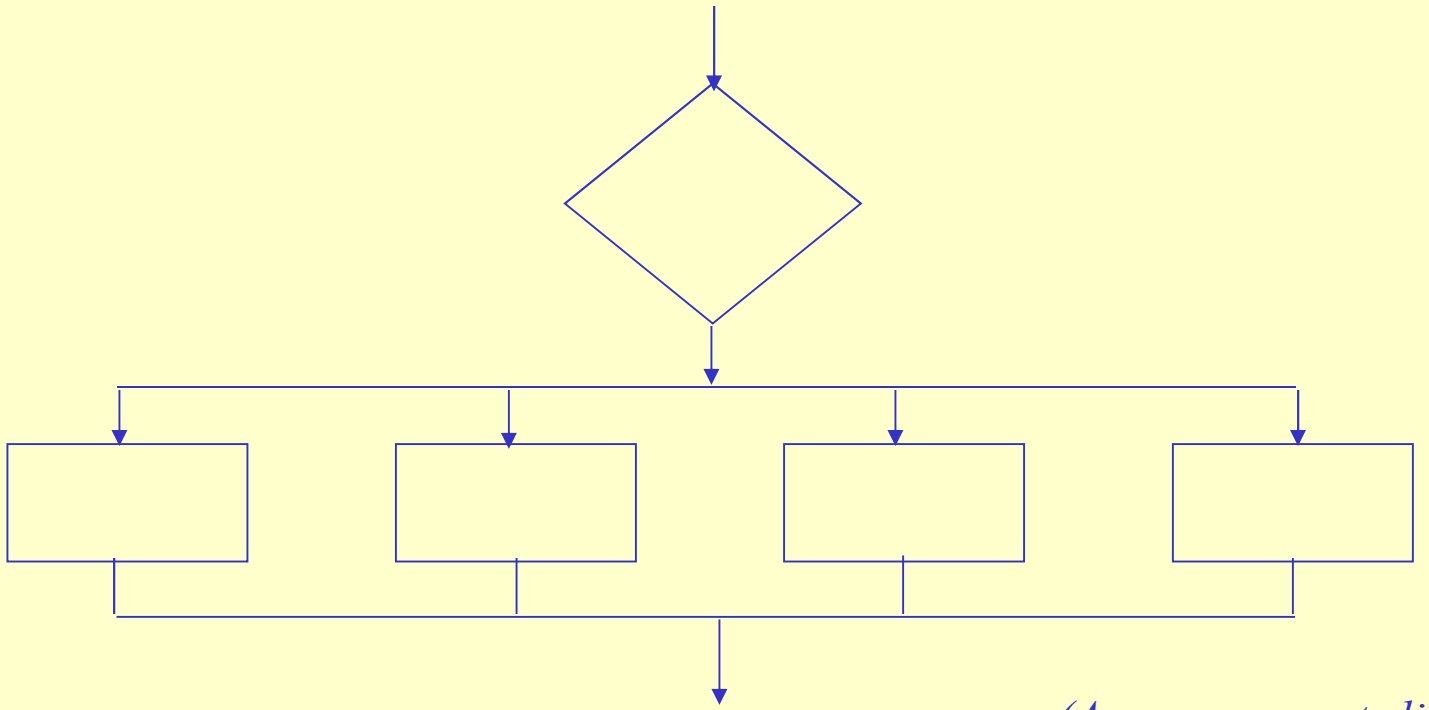
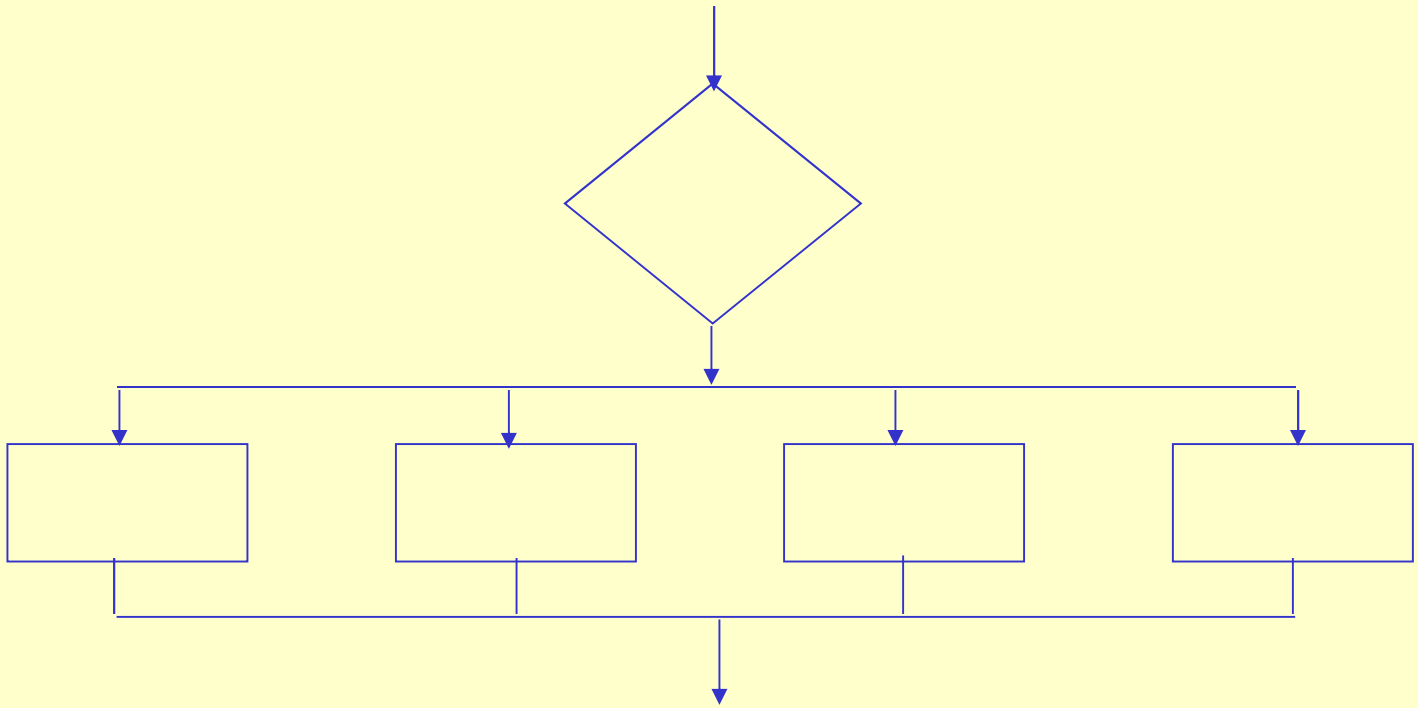


(Answer on next slide)

Answer

- Case



Review

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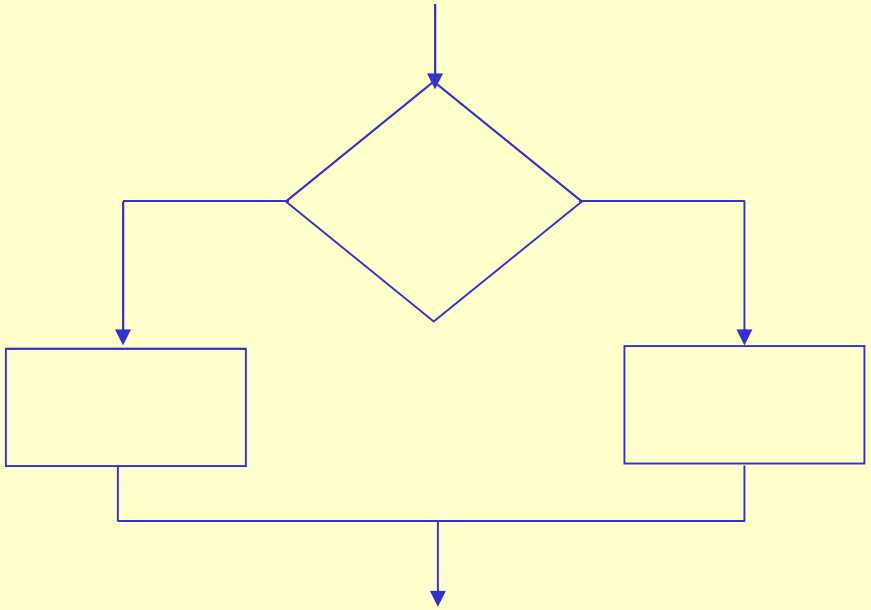
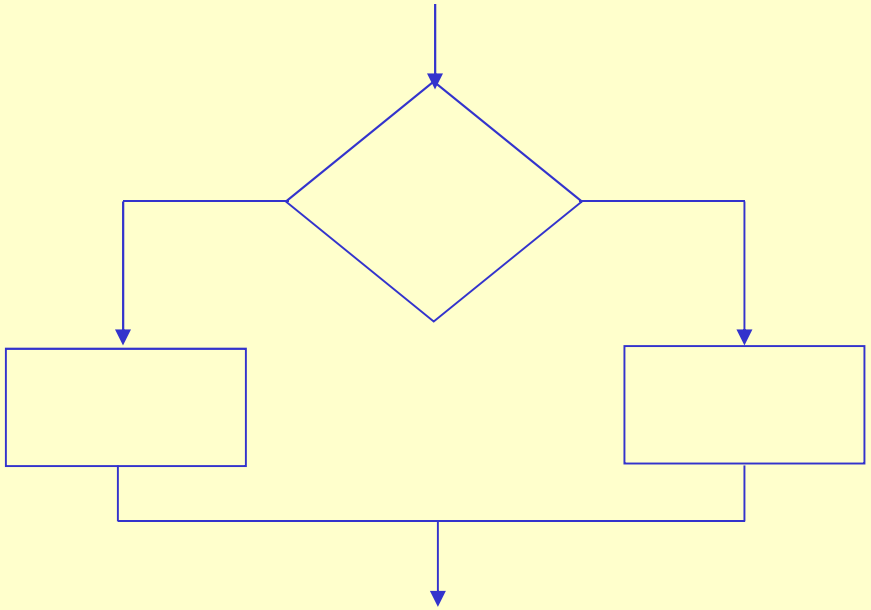


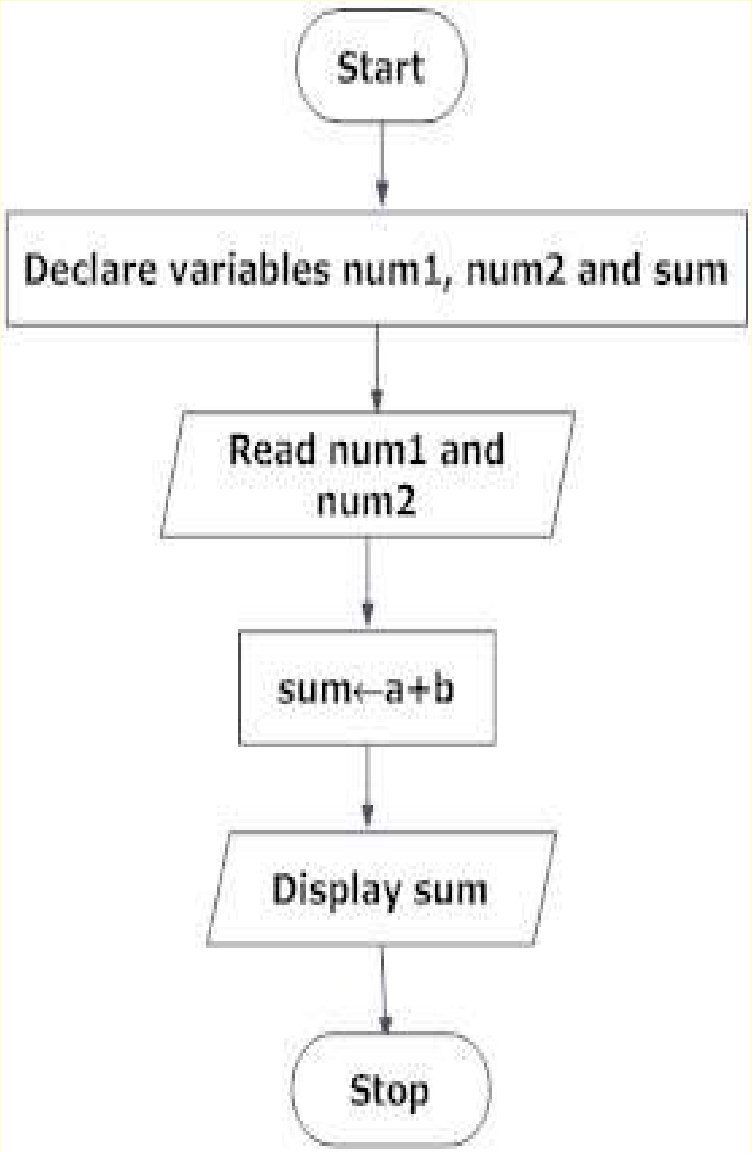
(Answer on next slide)

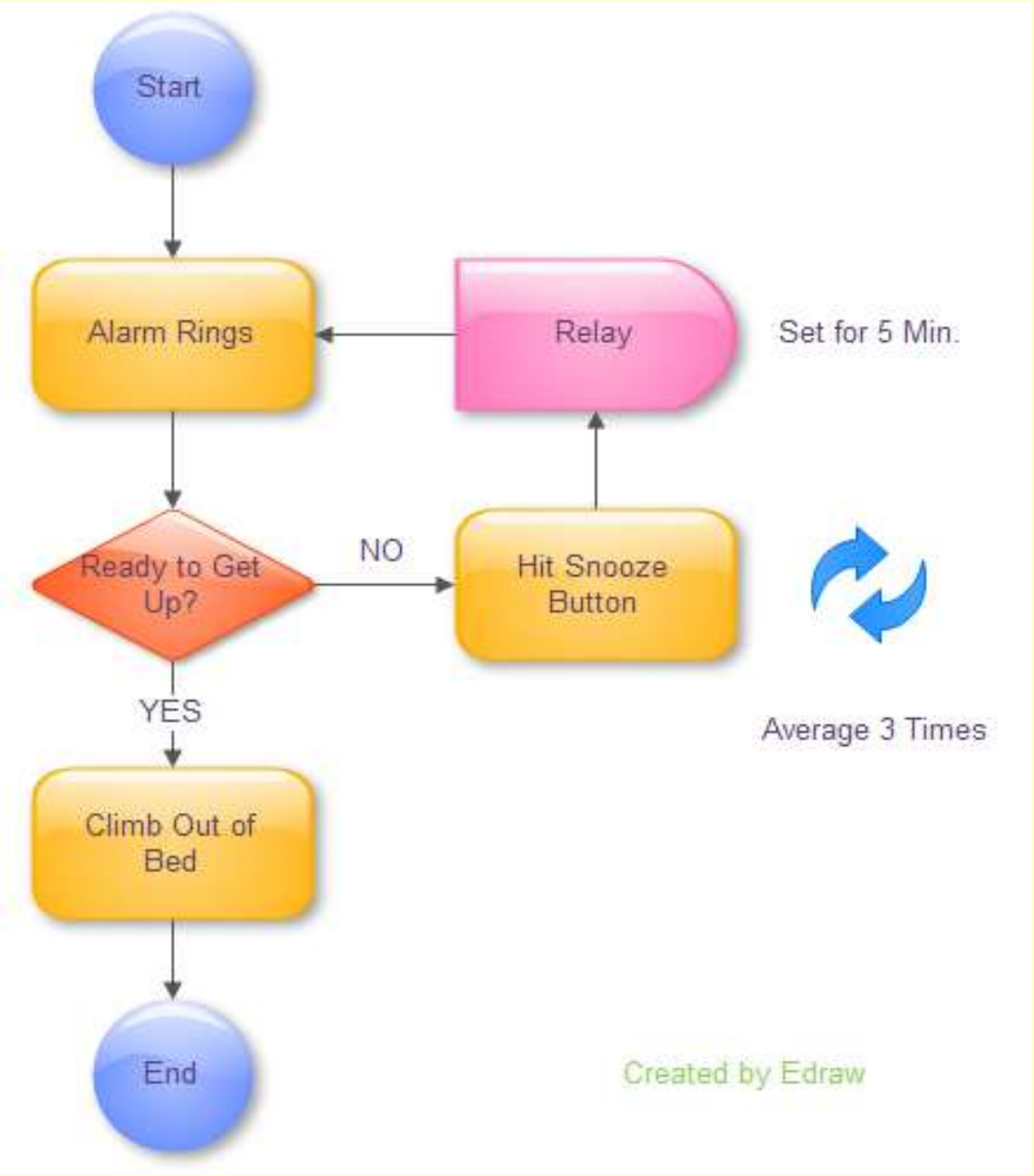
Answer

- Decision



Symbol	Name	Function
	Start/end	An oval represents a start or end point.
	Arrows	A line is a connector that shows relationships between the representative shapes.
	Input/Output	A parallelogram represents input or ouptut.
	Process	A rectangle represents a process.
	Decision	A diamond indicates a decision.


Start
Declare variables num1, num2 and sum
Read num1 and num2
sum←a+b
Display sum
Stop


Start
Alarm Rings
Relay
Set for 5 Min.
Ready to Get Up?
NO
Hit Snooze Button
YES
Average 3 Times
Climb Out of Bed
End
Created by Edraw

Examples ???