

Use Flowchart Symbols for Structured Programming

Workbook 1

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OBJECTIVES

At the conclusion of this Module, you will be able to Use Flowchart Symbols for Structured Programming:

- Use the terminal symbol
 - Identify the terminal symbol
 - Notice the terminal symbol is visualized as a capsule
 - Use the terminal symbol as either a start or end a process
 - Ensure flow charts have one beginning and one end
- Use of the flow line and connector symbols
 - Identify the flow line and connector symbol
 - Use flow lines to connect two non-flow lines symbols and show the flow of control
 - Ensure a unidirectional relationship between two non-flow line symbols
 - Ensure that flow lines should not connect to other flow lines without a connector symbol
- Use the input/output symbol
 - Identify the input/output symbol
 - Use the input/output symbol for input
 - Use input from a storage device
 - Use input from a keyboard
 - Use input from an electronic monitor
 - Use the input/output symbol for output
 - Use output to a storage device
 - Use output to a monitor
 - Use output to a printer
- Use the process symbol
 - Identify the process symbol
 - Use a process symbol to represent a single computer operation
 - Notice that a process symbol is used to represent a single step in an algorithm
 - Notice a process symbol could be used to represent a calculation
 - Notice a process symbol could be used to represent a assignment
 - Ensure only one step is represented in a process symbol
- Use the decision symbol
 - Identify the decision symbol
 - Notice that a decision symbol is often referred to as a decision diamond
 - Notice that a decision symbol is supposed to evaluate one or more outcomes
 - Use the use of the decision symbol to identify outcomes
 - Use of the decision symbol to identify one outcome
 - Use the decision symbol to identify two outcomes

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PRE INVENTORY

DIRECTIONS: Using your Response Sheet, circle the letter which best completes the following statements.

1. The terminal symbol is visualized as a _____ in structured programming flow charts.

a.



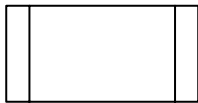
b.



c.



d.



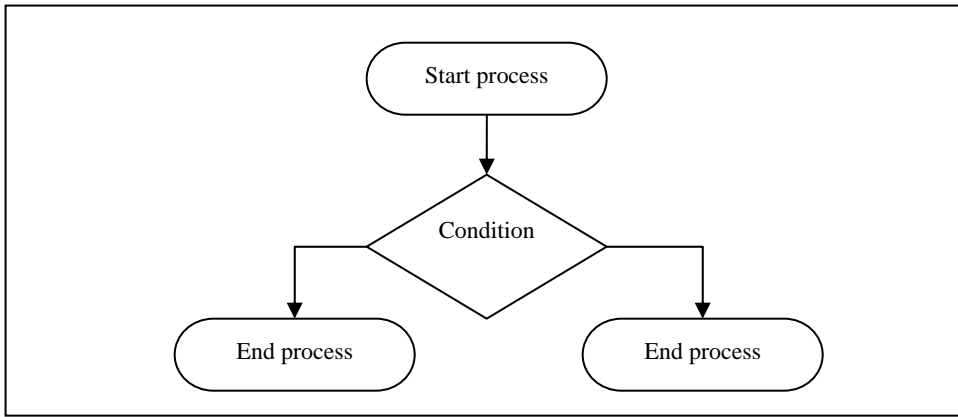
2. The terminal symbols can be used to _____ a flow chart process.

a. capture input and output in

b. start and end

c. open






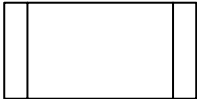

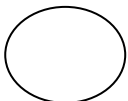
d. both 'a' and 'b' above



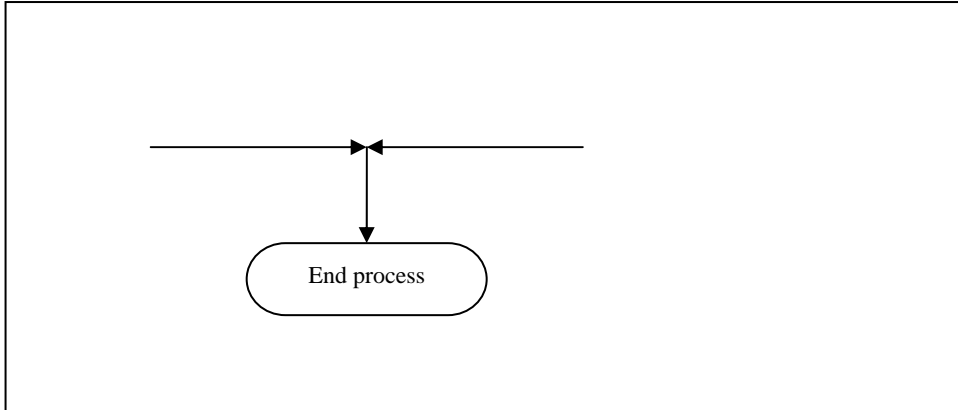
3. You can see that the example flowchart above would be considered incorrect because it _____.

- a. has more than one terminal end symbol
- b. has more than one terminal start symbol
- c. only has three terminal symbols
- d. should have four terminal symbols

4. The flow line symbol is visualized as a _____ in structured programming flow charts and the connector symbol is visualized as a _____.

- a.  
- b.  
- c.  
- d.  

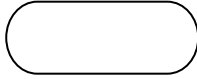
5. A flow line symbol is analogous to a _____ in structured programming.
- a. logical path
 - b. connector
 - c. process
 - d. terminal symbol



6. With regards to only the flow lines, you know the example flowchart above would be considered incorrect because _____.
- a. it does not use a connector symbol to connect flow lines
 - b. the two flow lines exhibit bi-directionality
 - c. it does use a connector symbol to connect two flow lines
 - d. both 'b' and 'c' above

7. The input/output symbol is visualized as a _____ in structured programming flow charts.

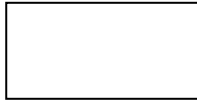
a.



b.



c.



d.



8. An input/output symbol could be used to visualize input from a _____ in a structured programming flowchart.

a. storage device

b. keyboard

c. electronic monitor

d. All of the above

9. An input/output symbol could be used to visualize output to a _____ in a structured programming flowchart.

a. storage device

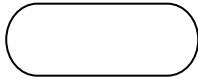
b. flowchart symbol

c. printer

d. both 'a' and 'c' above

10. The process symbol is visualized as a _____ in structured programming flow charts.

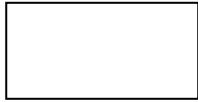
a.



b.



c.

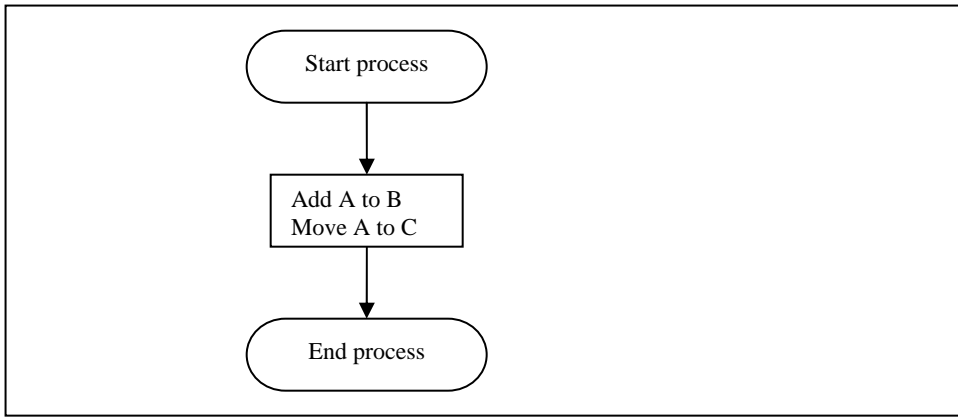


d.



11. A process symbol could be used to visualize _____ in a structured programming flowchart and is considered to be _____ in an algorithm.


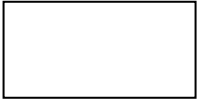
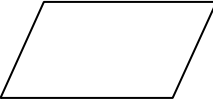
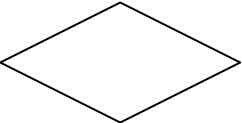
- a. a calculation or assignment; a single step
- b. a calculation or assignment; multiple steps
- c. multiple calculations or assignments; a single step
- d. multiple calculations or assignments; multiple steps



12. With regards to the process symbol, you know the example flowchart above would be considered incorrect because it _____.

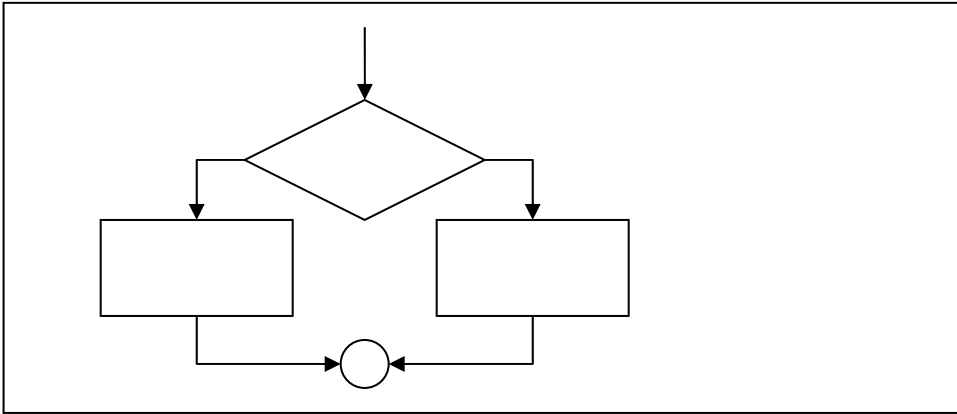
- a. uses the incorrect flow chart symbol for a process
- b. has two processes in one process box
- c. has only a calculation and an assignment are present
- d. should include only one flow line

13. The decision symbol is visualized as a _____ in structured programming flow charts.

- a. 
- b. 
- c. 
- d. 

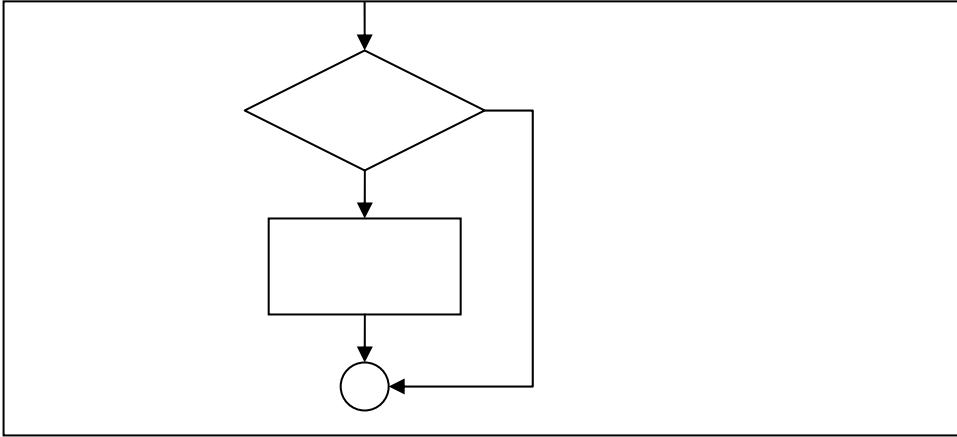
14. You know a decision symbol is often referred to as a(n) _____ and can be used to evaluate _____ or more outcomes.

- a. algorithm; one
- b. algorithm; two
- c. decision diamond; one
- d. decision diamond; two



15. With regards to the decision symbol, you know the example flowchart above evaluates _____ outcome(s).

- a. one
- b. two
- c. three
- d. four



16. With regards to the decision symbol, the example flowchart above evaluates _____ outcome(s).

- a. one
- b. two
- c. three
- d. four

TURN THE PAGE TO CHECK YOUR ANSWERS.

PRE INVENTORY KEY

- 1. A
- 2. B
- 3. A
- 4. D
- 5. A
- 6. A
- 7. B
- 8. D
- 9. D
- 10. C
- 11. A
- 12. B
- 13. D
- 14. C
- 15. B
- 16. A

DIRECTIONS

If you answered fifteen (15) questions correctly, you have sufficient knowledge of this Module. You may review this workbook if you deem necessary.

If you answered two (2) or more questions incorrectly, review the following pages.

IF YOU MISSED QUESTIONS			REVIEW PAGES
1	—	3	pages 14 - 18
4	—	6	pages 19 - 23
7	—	9	pages 24 - 28
10	—	12	pages 29 - 33
13	—	16	pages 34 - 38

Use Flowchart Symbols for Structured Programming

Introduction

In this module, you will learn how to **Use Flowchart Symbols for Structured Programming** including the following:

- Use the terminal symbol
 - Identify the terminal symbol
 - Notice the terminal symbol is visualized as a capsule
 - Use the terminal symbol as either a start or end a process
 - Ensure flow charts have one beginning and one end
- Use of the flow line and connector symbols
 - Identify the flow line and connector symbol
 - Use flow lines to connect two non-flow lines symbols and show the flow of control
 - Ensure a unidirectional relationship between two non-flow line symbols
 - Ensure that flow lines should not connect to other flow lines without a connector symbol
- Use the input/output symbol
 - Identify the input/output symbol
 - Use the input/output symbol for input
 - Use input from a storage device
 - Use input from a keyboard
 - Use input from an electronic monitor
 - Use the input/output symbol for output
 - Use output to a storage device
 - Use output to a monitor
 - Use output to a printer
- Use the process symbol
 - Identify the process symbol
 - Use a process symbol to represent a single computer operation
 - Notice that a process symbol is used to represent a single step in an algorithm
 - Notice a process symbol could be used to represent a calculation
 - Notice a process symbol could be used to represent an assignment
 - Ensure only one step is represented in a process symbol
- Use the decision symbol
 - Identify the decision symbol
 - Notice that a decision symbol is often referred to as a decision diamond
 - Notice that a decision symbol is supposed to evaluate one or more outcomes
 - Use the use of the decision symbol to identify outcomes
 - Use of the decision symbol to identify one outcome
 - Use the decision symbol to identify two outcomes

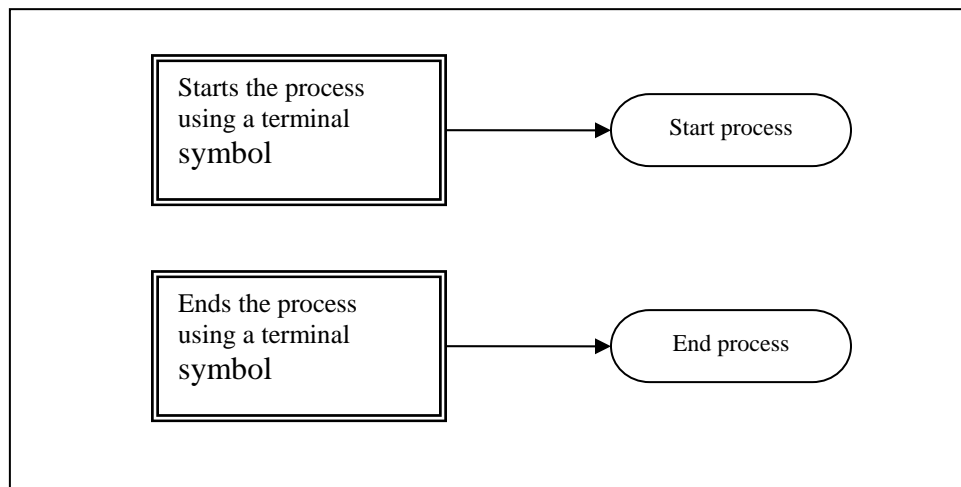
Use the Terminal Symbol

Purpose of the Terminal Symbol

The terminal symbol in structured programming flowcharts indicates a starting or ending point in the logic of a process.

Terminal Symbol Visualized as a Capsule

The terminal symbol is visualized as a capsule with text within it indicating whether the terminal symbol is being used as a starting or ending point. When reading a structured programming flowchart, the first step is to identify the starting point visualized as a terminal symbol. The process then can be followed to the ending terminal symbol, which indicates the end of the process being visualized. The figure below provides an example of how a terminal symbol might look as either a starting or ending process.



To use the terminal symbol, you need to know that:

- The terminal symbol can be used to represent either a starting or ending point of a process
- The terminal symbol is visualized as a capsule with text inside indicating whether it is a starting or ending point
- The terminal symbol is visualized as:

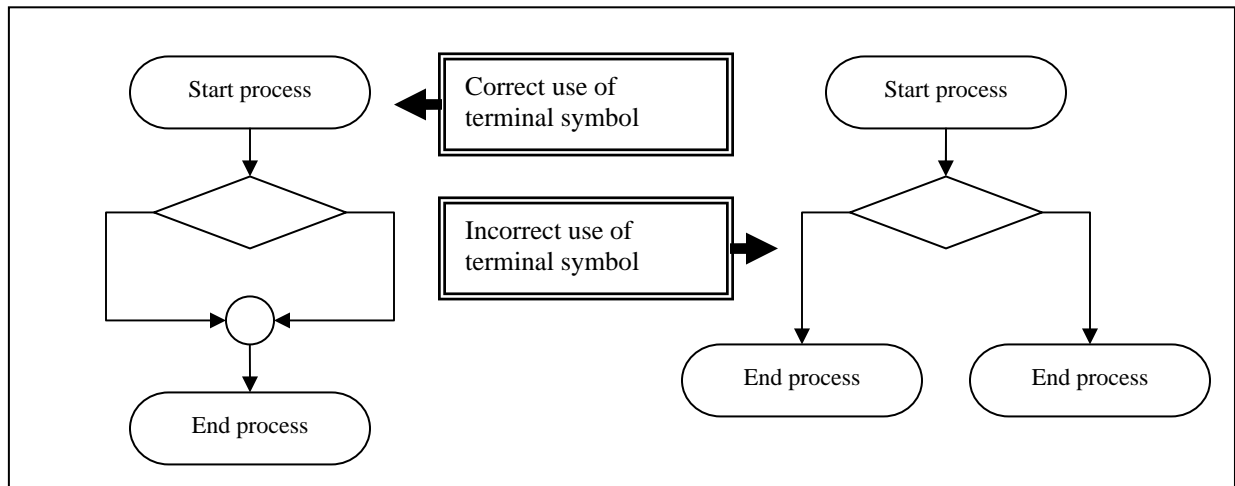
Information goes here

Terminal Symbol has one beginning and one end

A typical maze will usually only have one beginning and one ending point. If this were not the case, how would we know where to begin and where to end? A structured programming flowchart works much the same way. It should only have one beginning point and one ending point. Otherwise, users attempting to use the flowchart are likely to get confused.

Incorrect Flowcharts Due to Multiple Starting or Ending Points

If a software developer plans to use flowcharts to visualize complex logical processes, he or she should be able to identify flowcharts that do not follow the principle of having one beginning and ending point. The figure below shows two flowcharts. The first flowchart shows an example of a flowchart that follows this principle. The second flowchart shows an example of a flowchart that does not follow this principle. If you see more than one starting or ending point in a flowchart, you know this flowchart did not follow this principle.



To insure the proper use of terminal symbols in structured programming flowcharts:

- There should be only one beginning point and one ending point in a structured programming flowchart
- Generally a flowchart that has one beginning and one ending point does not violate this principle

PROGRESS REVIEW QUESTIONS

DIRECTIONS: Using your Response Sheet, circle the letter which best completes the following statements.

1. The terminal symbol is visualized as a _____ in structured programming flow charts.

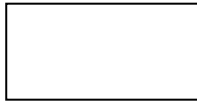
a.



b.



c.

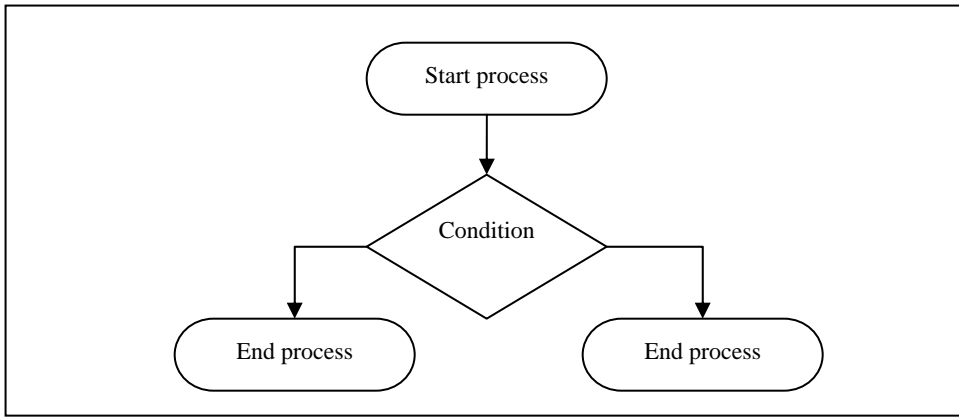


d.



2. The terminal symbols can be used to _____ a flow chart process.

- a. capture input and output in
- b. open and close
- c. start and end
- d. both 'a' and 'c' above



3. You can see that the example flowchart above would be considered incorrect because it _____.
- a. has more than one terminal start symbol
 - b. has more than one terminal end symbol
 - c. should have six terminal symbols
 - d. only has three terminal symbols

TURN THE PAGE TO CHECK YOUR ANSWERS

KEY

1. D
2. C
3. B

DIRECTIONS

If you answered any of the above questions incorrectly, review this section of the text before continuing.

If you answered the above questions correctly, proceed to the next section.

Use the Flow Line and Connector Symbols

Purpose of the Flow Line Symbol

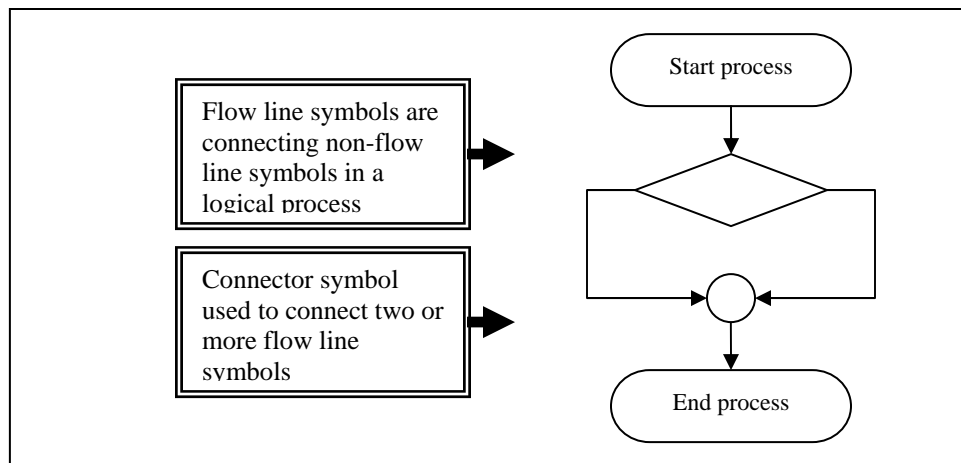
The flow line symbol in structured programming flowcharts connects various non-flow line symbols. It is intended to connect the various steps in the logical process of the flowchart.

Purpose of the Connector Symbol

The connector symbol in structured programming flowcharts is used to connect any two flow line symbols that follow the same logical path.

Flow Line and Connector Symbols Visualized

The flow line symbol is visualized as a unidirectional arrow connecting to flowchart items. When reading a structured programming flowchart, the flow line symbols connect the various steps in the logical process. The connector symbol is visualized as a circle and is used to connect to flow line symbols on a logical path. The figure below provides an illustration of how a connector symbol and flow line symbols might be used in a logical process.



To use the flow line and connector symbols, you need to know that:

- The flow line symbol can be used to connect two non-flow line symbols in a logical path
- The connector symbol can be used to connect one or more flow line symbols on a logical path
- The flow line and connector symbols are visualized as:



Flow line symbol



Connector symbol

Think Logical Path for Flow Line

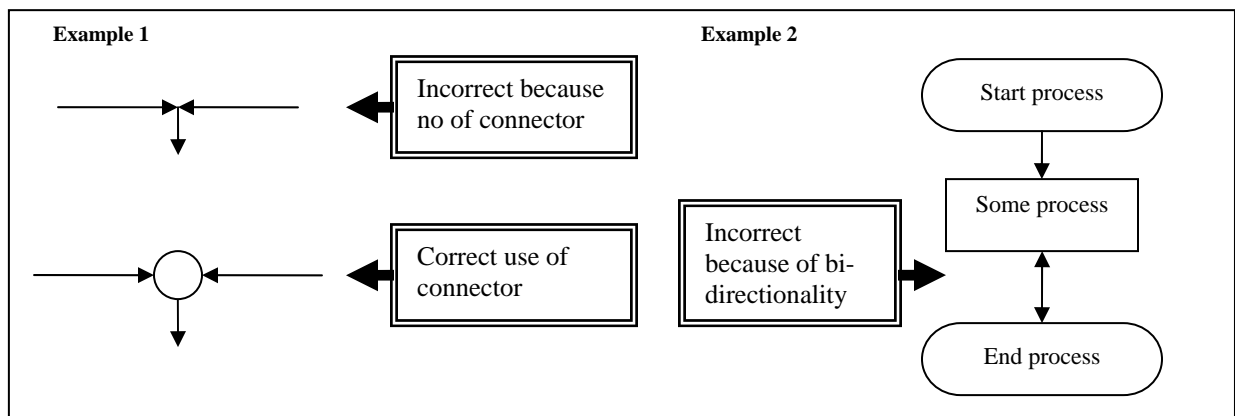
A flow line symbol should be thought of a logical path between steps in a logical process. The term logical path is analogous to flow line symbol in structured programming flowcharts

Incorrect Flowcharts Due to Missing Connectors

It is important to insure that your structured programming flowcharts do not connect two or more flow lines without the use of a connector symbol. A software developer should be able to identify flowcharts that do not follow this principle. In the figure below titled example 1, the first example shows what a flowchart might look like if it does not follow this principle. Directly below the incorrect figure is an example of how a connector would be used to resolve the problem.

Incorrect Flowcharts Due to Bidirectional Flow Lines

If a software developer plans to use flowcharts to visualize complex logical processes, he or she should be able to identify flowcharts that do not follow the principle of unidirectional flow lines. A single logical path cannot go in two directions without the use of a decision symbol which will be discussed in a subsequent lesson. The figure below titled example 2 shows what a flowchart that does not follow the principle of unidirectional flow lines. This is confusing to a reader of this flowchart because it would indicate that the logical path can go in both directions.



To insure the proper use of flow line and connector symbols in structured programming flowcharts:

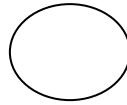
- Recognize that a flow line is analogous to a logical path.
- Ensure that connector symbols are used to connect any two or more flow line symbols on the same logical path.
- Ensure that the all flow lines used only have one direction – unidirectionality.

PROGRESS REVIEW QUESTIONS

DIRECTIONS: Using your Response Sheet, circle the letter which best completes the following statements.

4. The flow line symbol is visualized as a _____ in structured programming flow charts and the connector symbol is visualized as a _____.

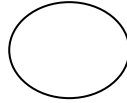
a.



b.



c.



d.



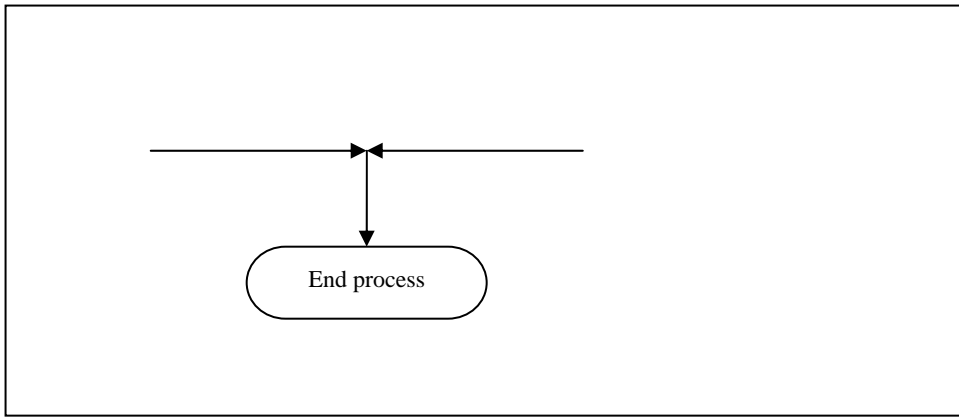
5. A flow line symbol is analogous to a _____ in structured programming.

a. connector

b. logical path

c. terminal symbol

d. process



6. With regards to only the flow lines, you know the example flowchart above would be considered incorrect because it _____.

- a. does use a connector symbol to connect flow lines
- b. does not include directionality
- c. does not use a connector symbol to connect two flow lines
- d. both 'a' and 'c' above

TURN THE PAGE TO CHECK YOUR ANSWERS

KEY

- 4. A
- 5. B
- 6. C

DIRECTIONS

If you answered any of the above questions incorrectly, review this section of the text before continuing.

If you answered the above questions correctly, proceed to the next section.

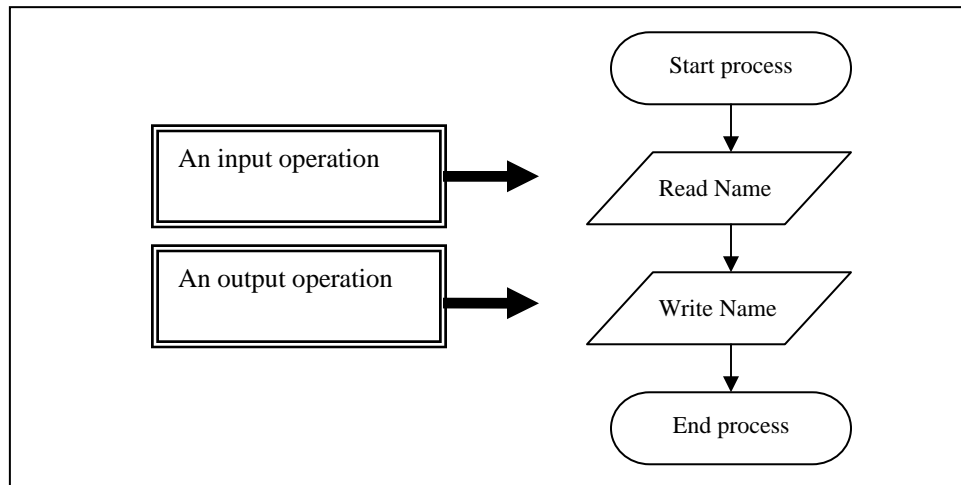
Purpose of the Input/Output Symbol

The input/output symbol in structured programming flowcharts is used to represent either an input or output operation, such as reading from a file or writing to a computer monitor.



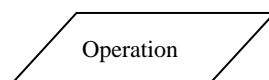
Terminal Symbol Visualized as a Capsule

The input/output symbol is visualized as a parallelogram with text within it indicating what type of the input or output operation is being used. An input/output symbol can be used only to represent a single input or output operation. Therefore, if a read operation is being visualized, the symbol cannot be used to also represent a write operation. It can only represent a single input or output operation. The figure below provides two examples of the input/output symbol being used.



To use the input/output symbol, you need to know that:

- The input/output symbol can be used to represent single input or output operation
- The input/output symbol is visualized as a parallelogram with text inside indicating the type of input or output operation
- The input/output symbol is visualized as:



Use the input/output symbol for an input operation

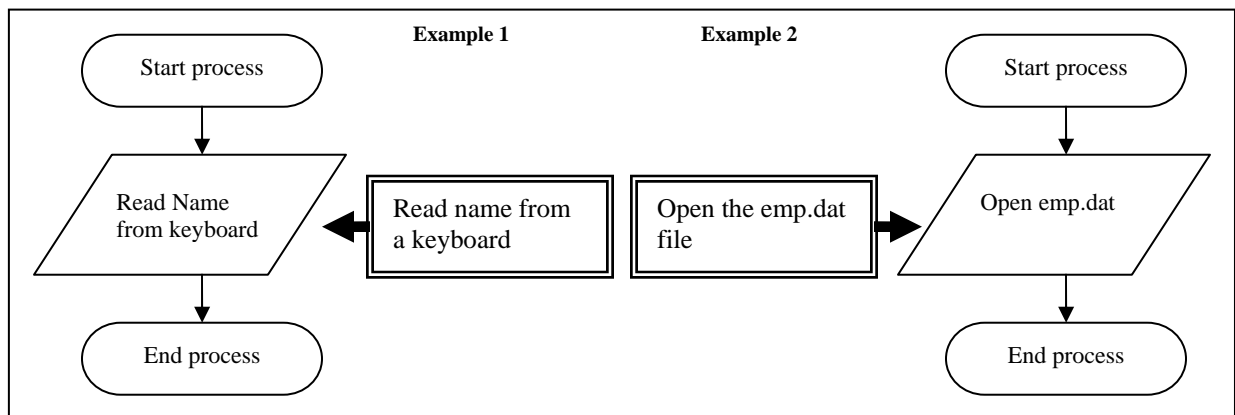
An input/output symbol used as input can be used for input from many different input devices. The specific type of operation is usually described as either an open or read operation, such as reading opening a file or from the keyboard.



It is important to note that if a logical process requires information that must be used; the flowchart must first show an input operation gathering that input for the subsequent process. A few of the devices described below are common devices used for input operations:

- A storage device – A storage device is used to store secondary memory – nonvolatile. Some examples of storage devices include floppy disks, hard drives, flash memory sticks, compact disks, or digital video disks.
- A keyboard – A keyboard is one of the more common input devices. A keyboard consists of various keys that allow the users to input data, control cursor and pointer locations, and to control the dialog with a computer.
- An electronic monitor – An electronic monitor is example of an uncommon input device. An electronic monitor, such as those used in point-of-sale systems are often referred to as touch screens. A user of an electronic monitor will type input on the screen

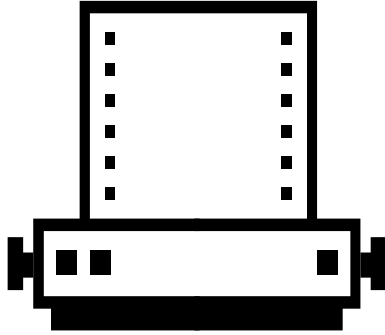
The examples provided above are not the only types of input devices or sources of input. The diagram below provides two examples of input: one from a user and one from a file. It is not necessary to specify the source or the device, as shown below. However, for clarity purposes it can sometimes be helpful to the user of the flowchart.



An input/output symbol can be used for input from:

- A storage device
- A keyboard
- An electronic monitor

Use the input/output symbol for an output operation

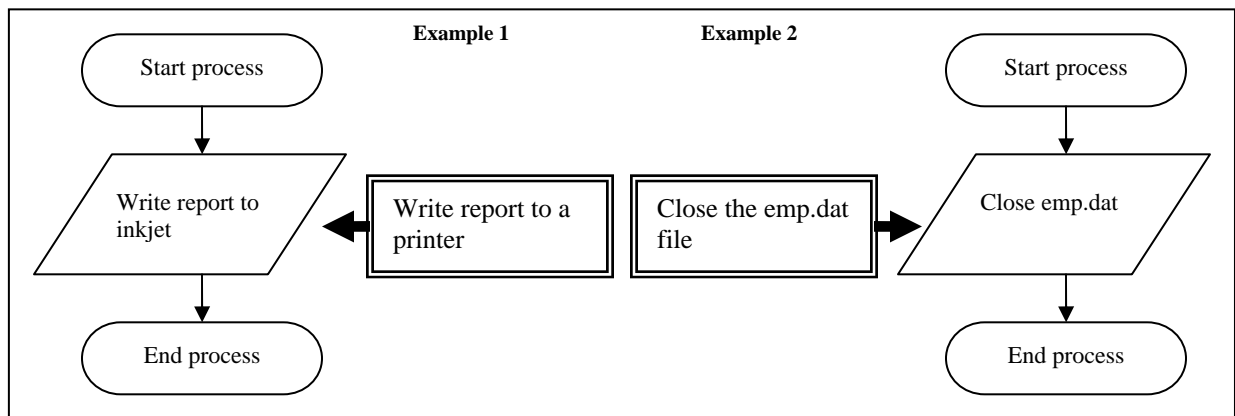


An input/output symbol used as output can be used for output to many different output devices. The specific types of operations are usually described as either a close or write operation, such as closing a file or writing to a printer.

It is important to note that some devices can be both input devices and output devices. For example, a touch screen electronic monitor or a storage device can be used for both output and input. A few of the devices described below are common devices used for output operations:

- A storage device – Described in input.
- An electronic monitor – Described in input.
- A printer - A printer is a computer peripheral device that produces a hard copy, which is a permanent human-readable text and/or combination of graphics, usually on paper, from data stored in a computer connected to it.

The examples provided above are not the only types of output devices. The diagram below provides two examples of output: one to a printer and to a file. It is not necessary to specify the device, as shown below. However, for clarity purposes it can sometimes be helpful to the user of the flowchart.



An input/output symbol can be used for output to:

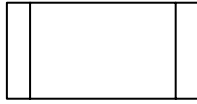
- A storage device
- An electronic monitor
- A printer

PROGRESS REVIEW QUESTIONS

DIRECTIONS: Using your Response Sheet, circle the letter which best completes the following statements.

7. The input/output symbol is visualized as a _____ in structured programming flow charts.

a.



b.



c.



d.



8. An input/output symbol could be used to visualize input from a _____ in a structured programming flowchart.

a. speaker

b. keyboard

c. electronic monitor

d. both 'b' and 'c' above

9. An input/output symbol could be used to visualize output to a _____ in a structured programming flowchart.

a. storage device

b. electronic monitor

c. printer

d. All of the above

TURN THE PAGE TO CHECK YOUR ANSWERS

KEY

- 7. C
- 8. D
- 9. D

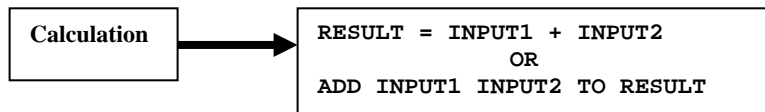
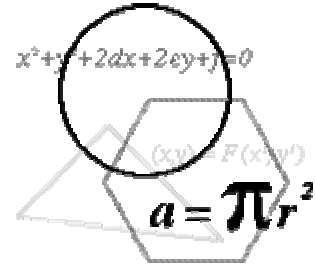
DIRECTIONS

If you answered any of the above questions incorrectly, review this section of the text before continuing.

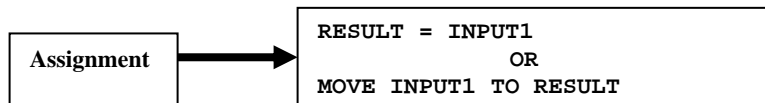
If you answered the above questions correctly, proceed to the next section.

Use the process symbol

The process symbol is used to represent any single operation in an algorithm. Generally, this type of operation is either a calculation or an assignment statement. A calculation is a deliberate process for transforming one or more inputs into a result using either arithmetic or logical operations. For example, the calculation below shows two ways of representing a single adding operation using two inputs and resulting in one output.



An assignment statement is similar to a calculation, but does not include a logical or mathematical operation. An assignment statement is the transfer of a value from one variable to another. For example, the assignment statements below show two ways of representing the transfer of one value to another:



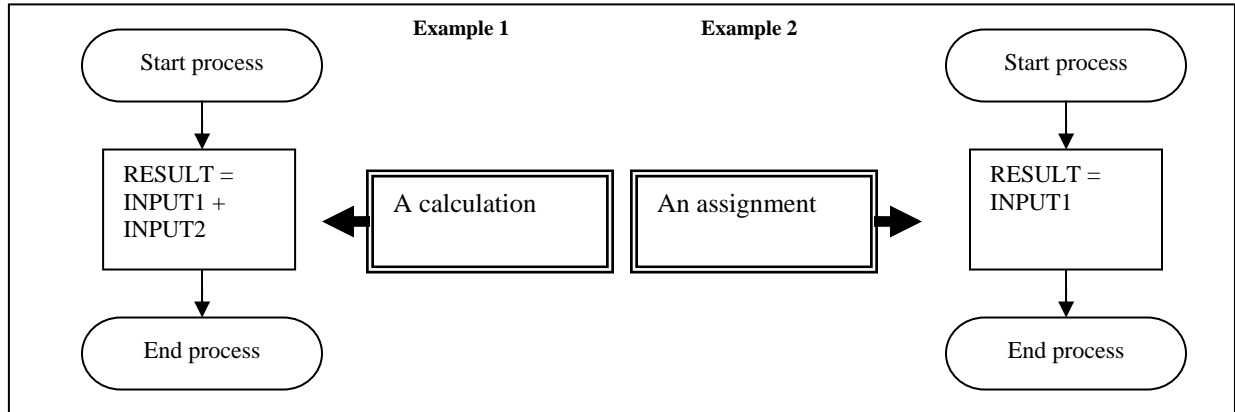
The process symbol can be used to represent these types of operations. These types of operations are considered single steps in an algorithm. An algorithm is a procedure or formula for solving a problem, and is what a flowchart represents in its entirety.

A process symbol can be used to:

- Represent a calculation
- Represent an assignment statement
- Represents a single computer operation in an algorithm

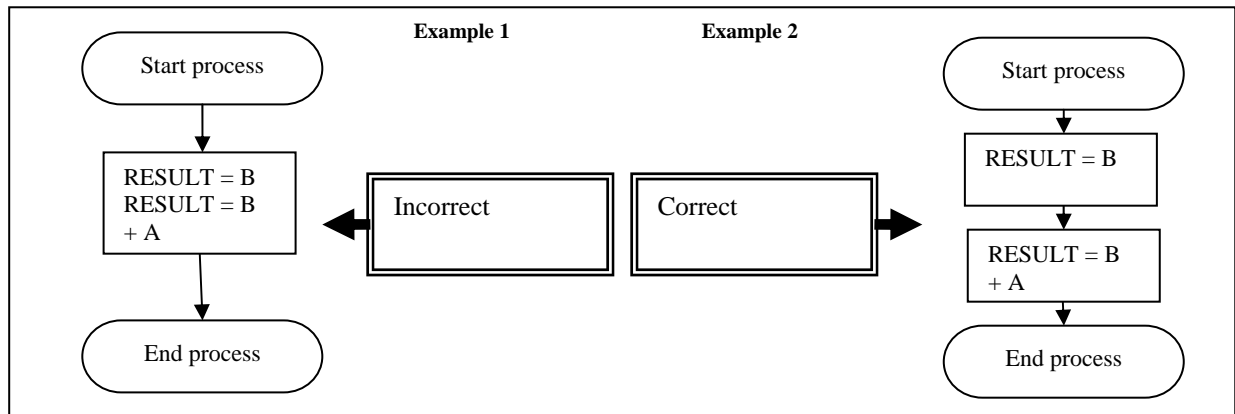
Process Symbol Visualized as a Rectangle

A process symbol in structured programming flowcharts is visualized as a rectangle with text inside representing the specific type of operation taking place. The type examples below show how a process symbol can be used for the operations shown above.



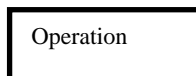
Incorrect Flowcharts Due to Multiple Processes in a Single Process Symbol

A software developer should be able to identify flowcharts that do not follow the principle of a single operation in a process symbol. A process symbol can only represent one operation per process symbol. The figure below provides an example of an incorrect use of a flowchart because of two processes in a single process symbol and how the process should be represented.



A process symbol is:

- Only a single calculation or assignment statement
- Visualized as a rectangle with text inside indicating the type of operation
- The input/output symbol is visualized as:

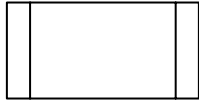


PROGRESS REVIEW QUESTIONS

DIRECTIONS: Using your Response Sheet, circle the letter which best completes the following statements.

10. The process symbol is visualized as a _____ in structured programming flow charts.

a.



b.



c.

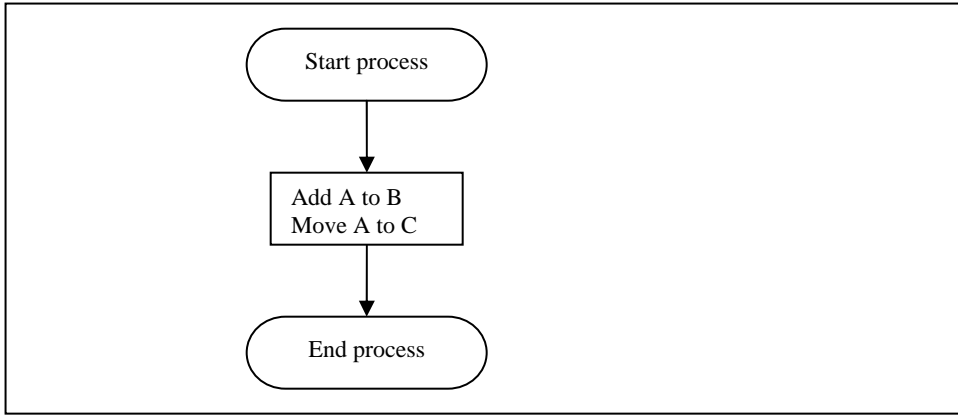


d.



11. A process symbol could be used to visualize _____ in a structured programming flowchart and is considered to be _____ in an algorithm.

- a. two calculations or assignments; multiple steps
- b. two calculations or assignments; a single step
- c. a calculation or assignment; multiple steps
- d. a calculation or assignment; a single step



12. With regards to the process symbol, you know the example flowchart above would be considered incorrect because it _____.

- a. has two processes in one process box
- b. uses the incorrect flow chart symbol for a process
- c. should not include only one flow line
- d. has only a calculation and an assignment are present

TURN THE PAGE TO CHECK YOUR ANSWERS

KEY

- 10. C
- 11. D
- 12. A

DIRECTIONS

If you answered any of the above questions incorrectly, review this section of the text before continuing.

If you answered the above questions correctly, proceed to the next section.

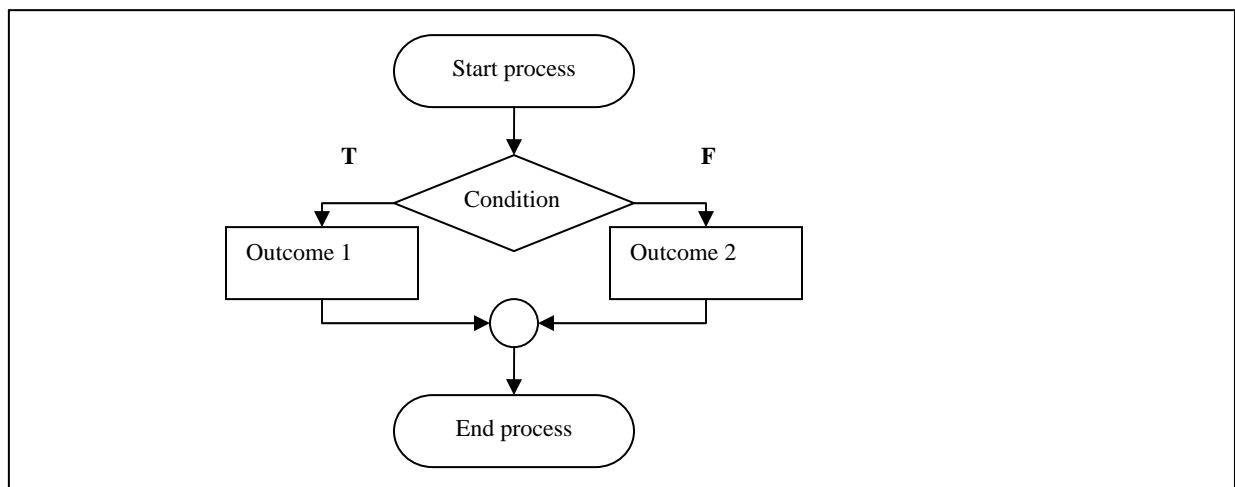
Use the decision symbol

Decision Symbol Purpose

A decision symbol is one of the most powerful visual aids in structured programming flowcharts. It is used to evaluate one or more outcomes – logical paths. Alternative paths are taken based on the evaluation of a decision symbol.

Decision Symbol Visualized as a Diamond

If a software developer plans to visualize one or more outcomes, a decision symbol must be used. Since a decision symbol looks like a diamond, we sometimes refer to a decision symbol as a decision diamond. A decision diamond is used to show the logical path that should be taken. A decision symbol is visualized as a diamond with text inside indicating the condition to be evaluated. The figure below shows how a decision symbol can be used to evaluate two outcomes based on a condition.



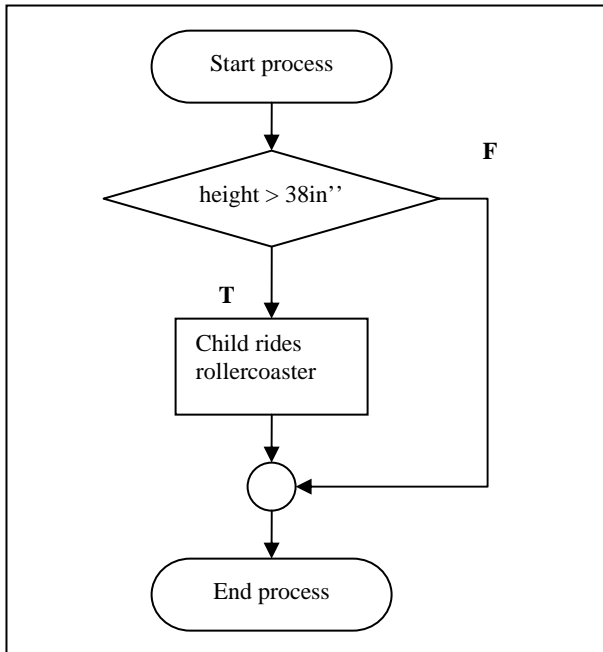
The figure above shows two possible outcomes based on one condition. If the condition evaluates to true, the left path is taken. If the condition evaluates to false, the right path is taken. This is what is meant to evaluate between one or more outcomes.

To use the decision symbol, you need to know that:

- A decision symbol is sometimes referred to as a decision diamond
- The decision symbol is visualized as a diamond with text inside indicating the condition to be evaluated
- The decision symbol is visualized as:



Use the use of the decision symbol to identify outcomes



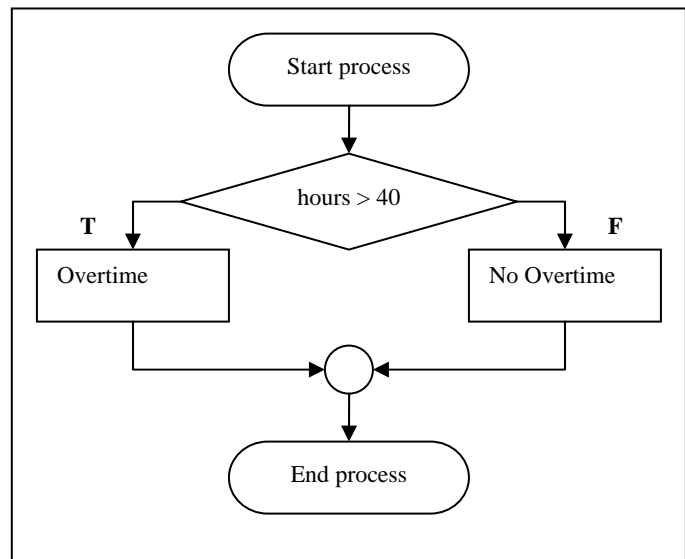
As previously mentioned, the decision diamond is used to evaluate outcomes based on some condition. To shed more light, this section will show an example of one outcome evaluated and an example of two outcomes evaluated based on a condition.

Identify One Outcome

The following sentence represents a condition with one outcome. If a child is greater than 38in'' tall, he can ride on the rollercoaster, otherwise, he cannot. The one outcome here is that a child will ride the rollercoaster. Since not riding a rollercoaster is not a process or action, then we do not consider it a possible outcome. The figure to the left shows this visualized as a flowchart.

Identify Two Outcomes

The concept of overtime pay provides a very strong example of a condition being evaluated with two possible outcomes. If an employee worked more than forty hours in one week, he is paid time and one half, otherwise, he is paid normally. In this example, regardless of whether the condition is true or false, two possible outcome or actions or processes are taken. The figure to the right shows this visualized as a flowchart.



Notice that the corners of the diamond are not required as being true or false, they are interchangeable as long as they are marked properly.

You should be able to identify a decision symbol used to:

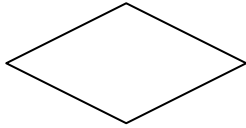
- Evaluate one outcome
- Evaluate two outcomes

PROGRESS REVIEW QUESTIONS

DIRECTIONS: Using your Response Sheet, circle the letter which best completes the following statements.

13. The decision symbol is visualized as a _____ in structured programming flow charts.

a.



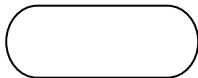
b.



c.



d.



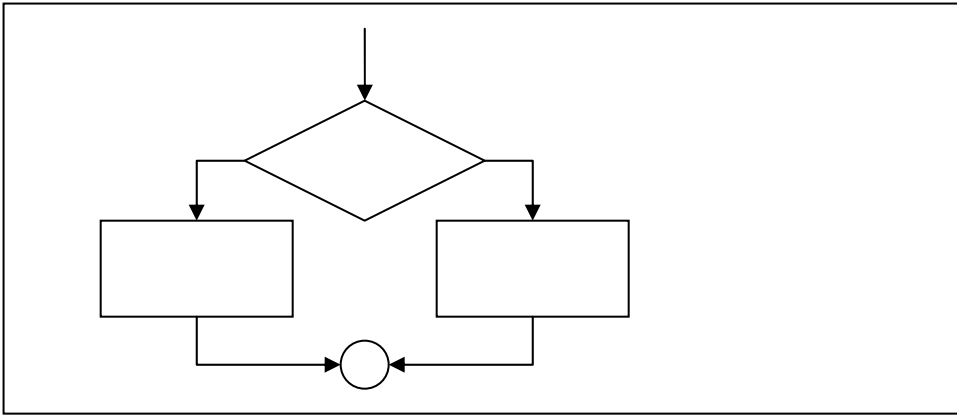
14. You know a decision symbol is often referred to as a(n) _____ and can be used to evaluate _____ or more outcomes.

a. operation ; one

b. decision diamond; one

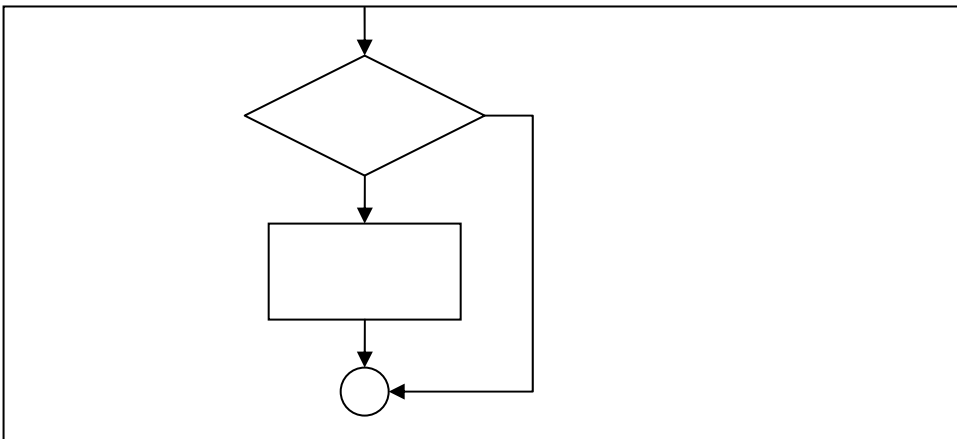
c. operation; two

d. decision diamond; two



15. With regards to the decision symbol, you know the example flowchart above evaluates _____ outcome(s).

- a. two
- b. three
- c. four
- d. five



16. With regards to the decision symbol, the example flowchart above evaluates _____ outcome(s).

- a. four
- b. three
- c. two
- d. one

TURN THE PAGE TO CHECK YOUR ANSWERS

KEY

- 13. A
- 14. B
- 15. A
- 16. D

DIRECTIONS

If you answered any of the above questions incorrectly, review this section of the text before continuing.

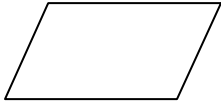
If you answered the above questions correctly, proceed to the next section.

POST INVENTORY

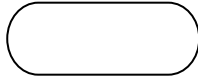
DIRECTIONS: Using your Response Sheet, circle the letter which best completes the following statements.

1. The terminal symbol is visualized as a _____ in structured programming flow charts.

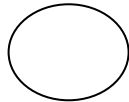
a.



b.



c.



d.



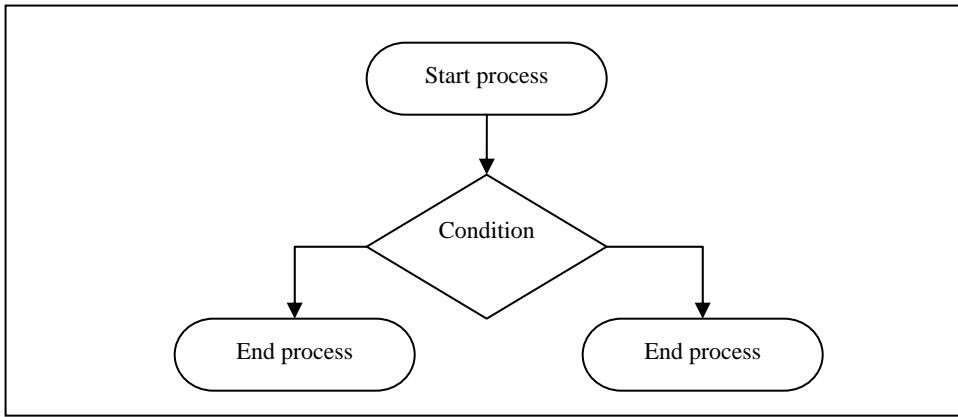
2. The terminal symbols can be used to _____ a flow chart process.

a. capture input and output in

b. close

c. start and end




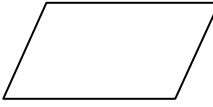



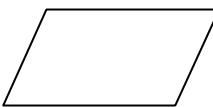
d. both 'a' and 'b' above



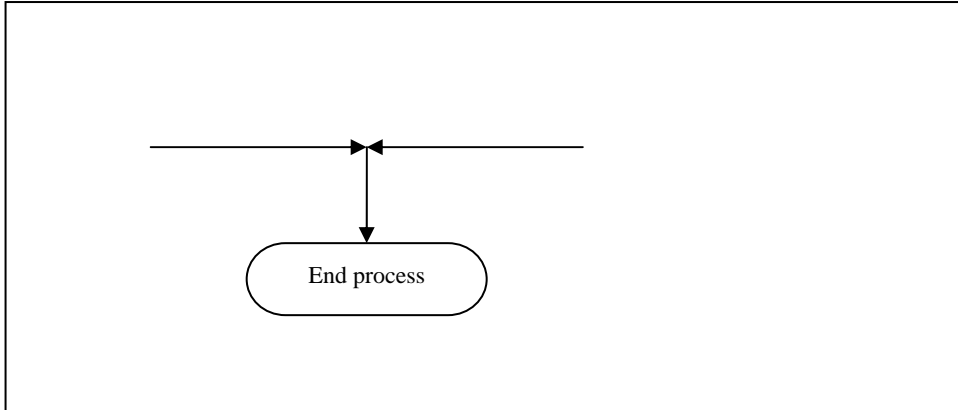
3. You can see that the example flowchart above would be considered incorrect because it _____.

- a. should have six terminal symbols
- b. only has three terminal symbols
- c. has more than one terminal start symbol
- d. has more than one terminal end symbol

4. The flow line symbol is visualized as a _____ in structured programming flow charts and the connector symbol is visualized as a _____.

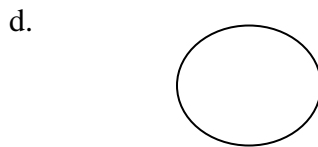
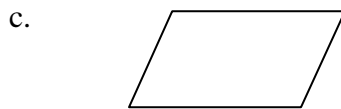
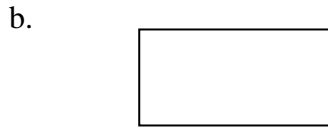
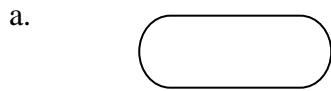
- a.  
- b.  
- c.  
- d.  

5. A flow line symbol is analogous to a _____ in structured programming.
- a. process
 - b. logical path
 - c. terminal symbol
 - d. connector



6. With regards to only the flow lines, you know the example flowchart above would be considered incorrect because _____.
- a. it does use a connector symbol to connect two flow lines
 - b. it does not use a connector symbol to connect flow lines
 - c. the two flow lines exhibit bi-directionality
 - d. both 'b' and 'c' above

7. The input/output symbol is visualized as a _____ in structured programming flow charts.



8. An input/output symbol could be used to visualize input from a _____ in a structured programming flowchart.

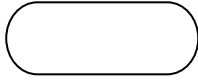
- a. storage device
- b. electronic monitor
- c. keyboard
- d. All of the above

9. An input/output symbol could be used to visualize output to a _____ in a structured programming flowchart.

- a. printer
- b. electronic monitor
- c. storage device
- d. All of the above

10. The process symbol is visualized as a _____ in structured programming flow charts.

a.



b.



c.

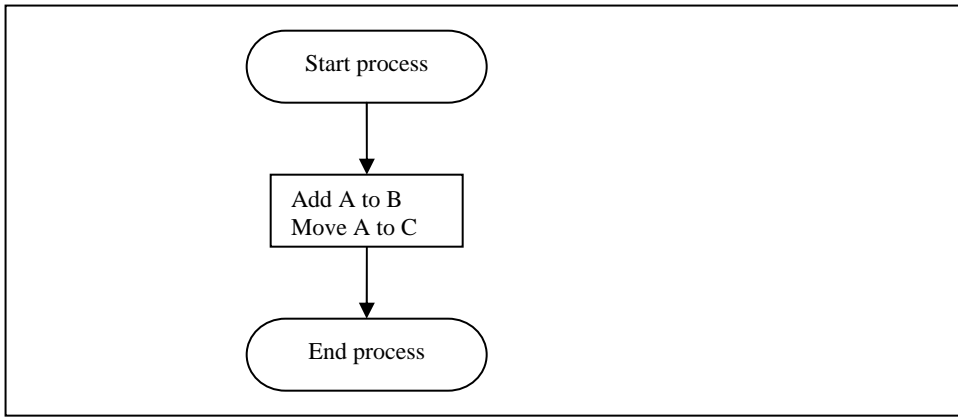


d.



11. A process symbol could be used to visualize _____ in a structured programming flowchart and is considered to be _____ in an algorithm.



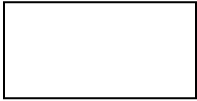
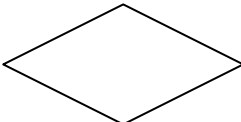
- a. multiple calculations or assignments; multiple steps
- b. multiple calculations or assignments; a single step
- c. a calculation or assignment; multiple steps
- d. a calculation or assignment; a single step



12. With regards to the process symbol, you know the example flowchart above would be considered incorrect because it _____.

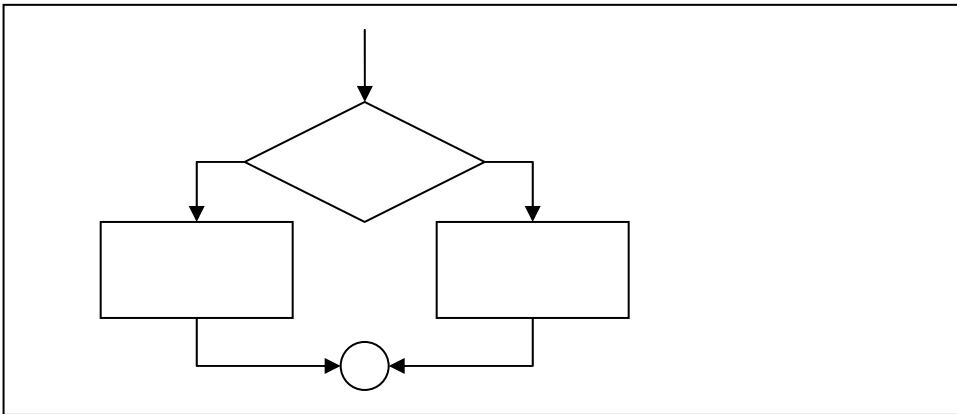
- a. uses the incorrect flow chart symbol for a process
- b. should include only one flow line
- c. has two processes in one process box
- d. has only a calculation and an assignment are present

13. The decision symbol is visualized as a _____ in structured programming flow charts.

- a. 
- b. 
- c. 
- d. 

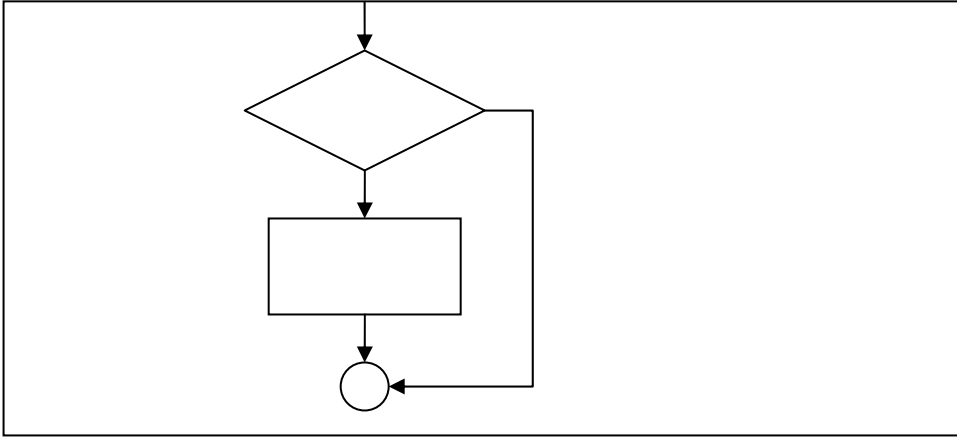
14. You know a decision symbol is often referred to as a(n) _____ and can be used to evaluate _____ or more outcomes.

- a. algorithm; one
- b. decision diamond; two
- c. decision diamond; one
- d. algorithm; two



15. With regards to the decision symbol, you know the example flowchart above evaluates _____ outcome(s).

- a. four
- b. three
- c. two
- d. one



16. With regards to the decision symbol, the example flowchart above evaluates _____ outcome(s).

- a. two
- b. one
- c. four
- d. three

TURN THE PAGE TO CHECK YOUR ANSWERS.

POST INVENTORY KEY

1. B
2. C
3. D
4. C
5. B
6. B
7. C
8. D
9. D
10. B
11. D
12. C
13. D
14. C
15. C
16. B

DIRECTIONS

If you answered fifteen (15) questions correctly, you have sufficient knowledge of this Module. You may review this workbook if you deem necessary.

If you answered two (2) or more questions incorrectly, review the following pages.

IF YOU MISSED QUESTIONS			REVIEW PAGES
1	—	3	pages 14 - 18
4	—	6	pages 19 - 23
7	—	9	pages 24 - 28
10	—	12	pages 29 - 33
13	—	16	pages 34 - 38