Review for Exam 2

Topics to Review

- Structured Programming
- Converting Flowcharts to Pseudocode
- Converting Pseudocode to Flowcharts
- Developing Algorithms Using Sequences, Loops and Selections

Structured Programming

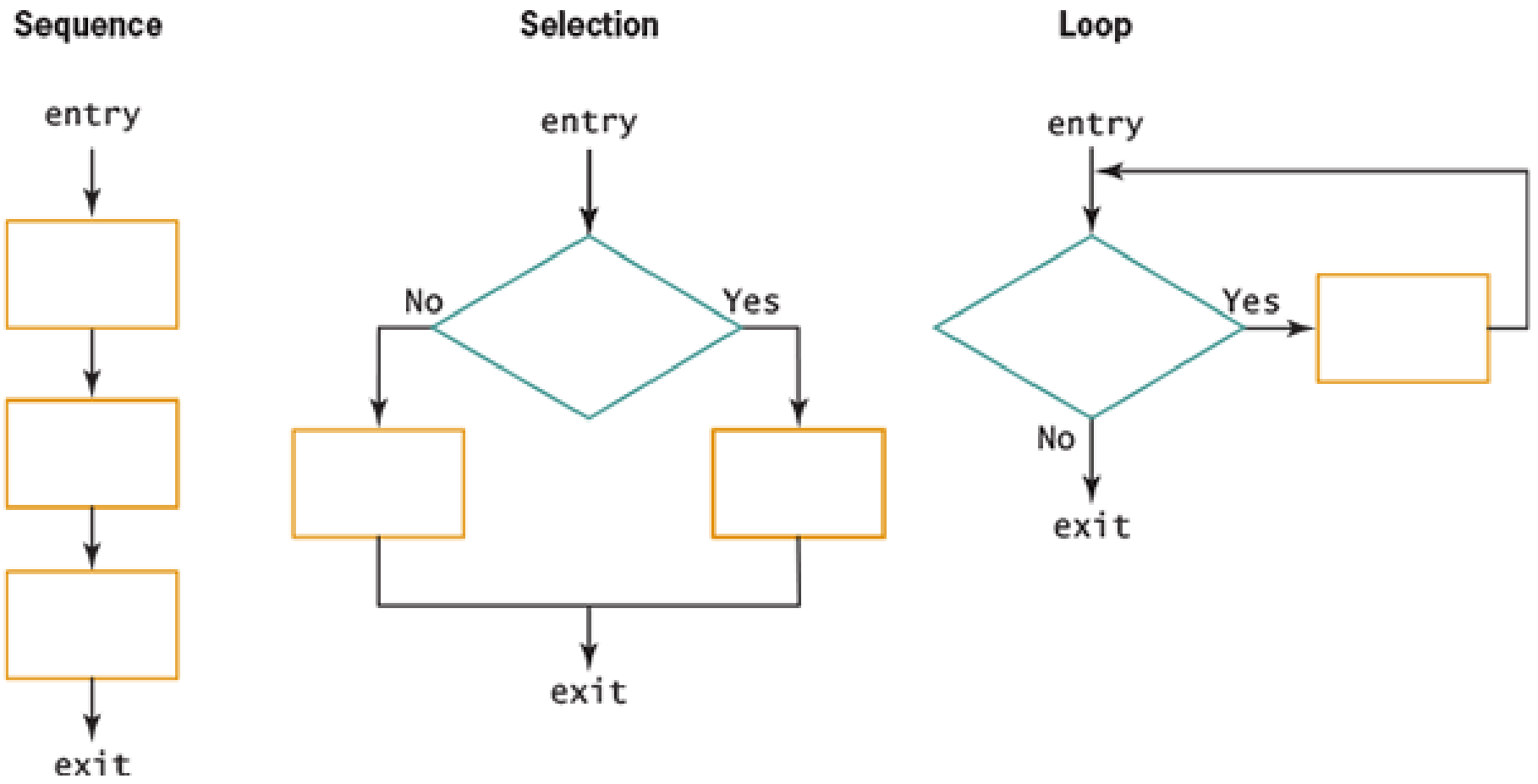
- All programs, no matter how complicated, can be constructed using one or more of only three structures
  - Sequence
  - Selection
  - Loop
- **Sequence** is just a series of statements.

Structured Programming

- **Selection** (also known as Decision) is a test on a condition. If the condition is true you follow one path and if it is false you follow another path.
  - If – then – else – end if
  - The 'else' is optional, sometimes you do nothing when the condition is false – this is the **Single Alternative Selection**

- **Loop** – repeating a statement or sequence of statements while a certain condition is true.
  - While – loop – end loop
  - Many ways to control the execution of a loop

Structured Programming



Structured Programming

- Sequence

  do step1
  do step2
  do step3

- Selection (Decision)

  if someCondition is true **then**
    doProcessA()
  else
    doProcessB()
  endif

- Selection (null case)

  if someCondition is true **then**
    doProcessA()
  endif

- Loop

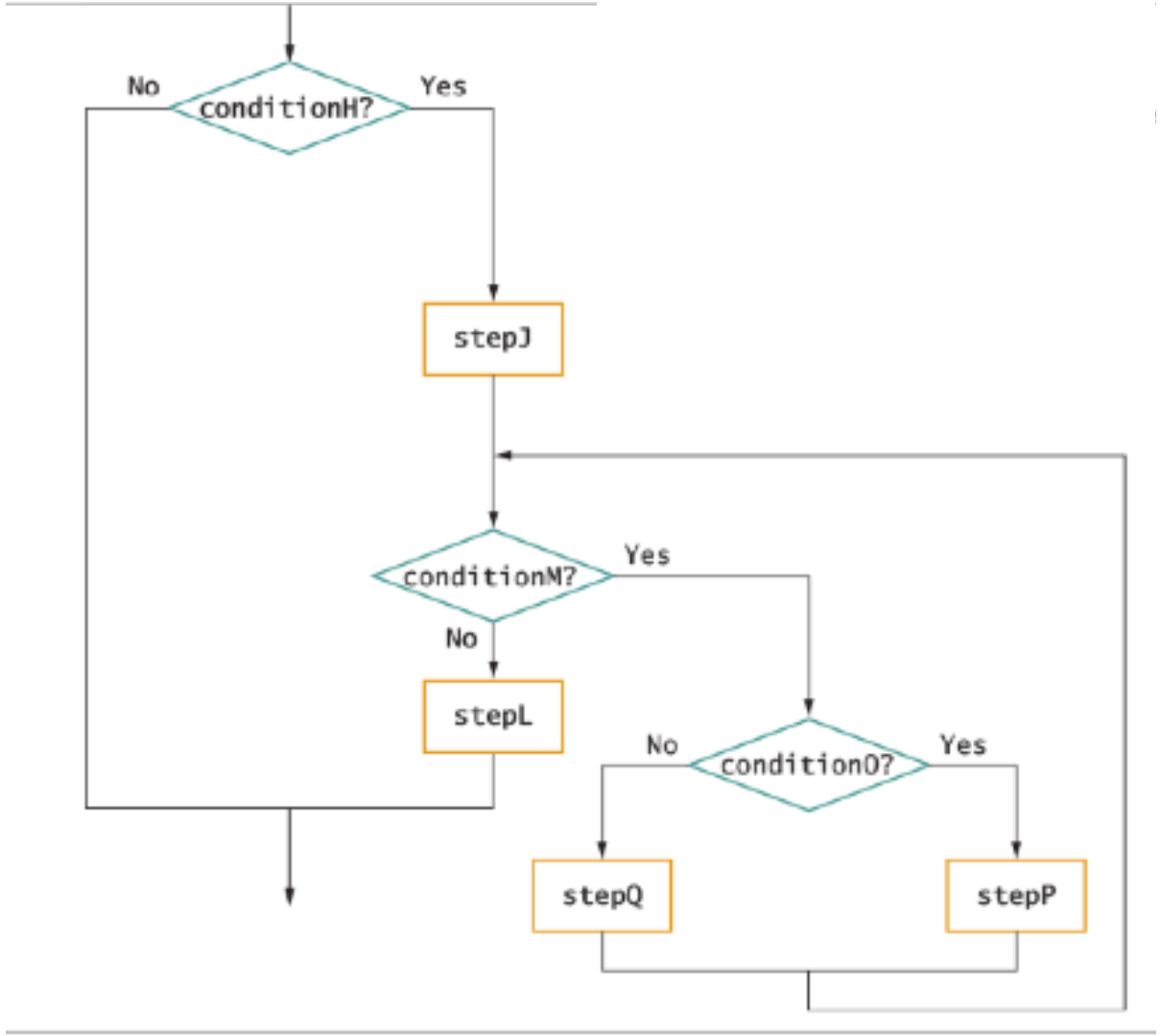
  while someCondition is true **do**
    doProcessA()
  endwhile

Structured Programming

- Understand how structures can be stacked in sequence and how they can be nested
- Understand that a loop structure must return to the condition and that you need to using a priming input before the loop and another input as the last step in the loop
- Understand how to write pseudocode from a flowchart and to draw a flowchart from pseudocode
- Understand how to fix an unstructured flowchart so that it is structured.

Convert a Flowchart to Pseudocode

Given this flowchart.



Convert a Flowchart to Pseudocode

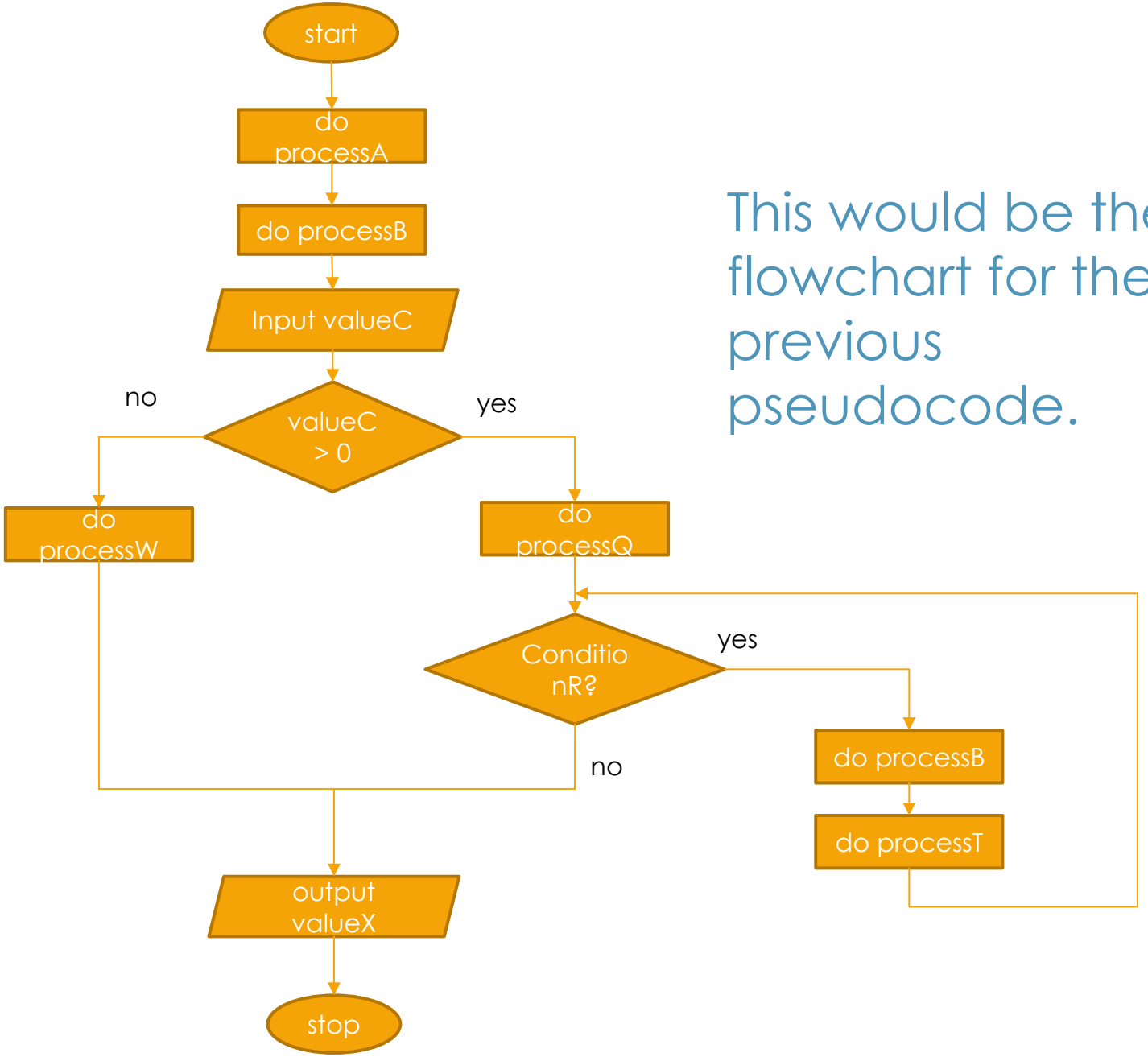
```
start
      if  conditionH? then
       step J
       while conditionM? loop
             if conditionO? then
              step P
             else
              step Q
             end if
       end loop
            step L
      end if
stop
```

This would be the Pseudocode for the previous flowchart.

Convert Pseudocode to a Flowchart

Given this pseudocode.

```
start
    do processA
    do processB
    input valueC
    if valueC is greater than 0 then
        do processQ
       while conditionR is true do
            do processB
            do processT
       end while
   else
        do processW
   end if
   output valueX
stop
```



This would be the flowchart for the previous pseudocode.

Developing Algorithms

- Analyze the inputs, processing and outputs
- Identify main loop, if there is one, and determine how to control the loop execution
- Identify decisions and actions to be taken in each case
- Identify any other repetitions required
- Determine the order of the processing steps
- Write pseudocode or develop flowchart