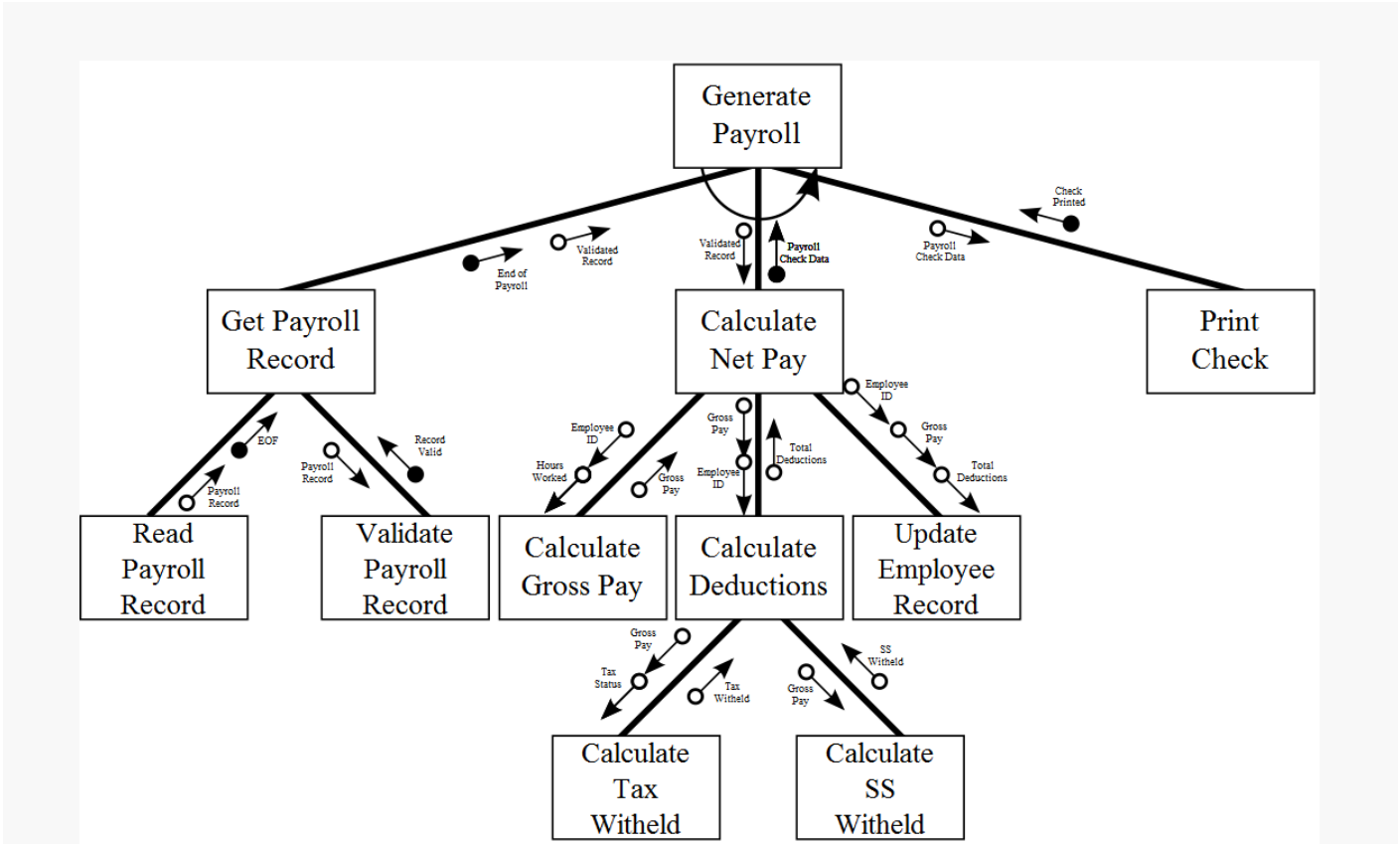


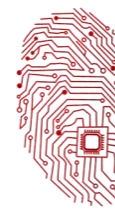
Topic: 2.1.2 Structure chart

Structure charts



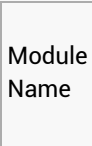
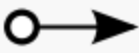
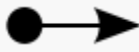
A Structure Chart in software engineering is a chart which shows the breakdown of a system to its lowest manageable parts. They are used in structured programming to arrange program modules into a tree. Each module is represented by a box, which contains the module's name. The tree structure visualizes the relationships between modules, showing data transfer between modules using arrows.





Topic: 2.1.2 Structure chart

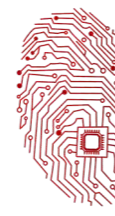
Structured Charts are an example of a **top-down** design where a problem (the program) is broken into its components.

Symbol	Name	Meaning
	Process	Each Box represents a programming module, this might be something that calculates the average of some figures, or prints out some pay slips
	Data Couple	Data being passed from module to module that needs to be processed.
	Flag	[Extension - you don't need to know this for the exam] Check data sent to process to stop or start processes. For example when the End of a File that is being read is reached, or a flag to say whether data sent was in the correct format

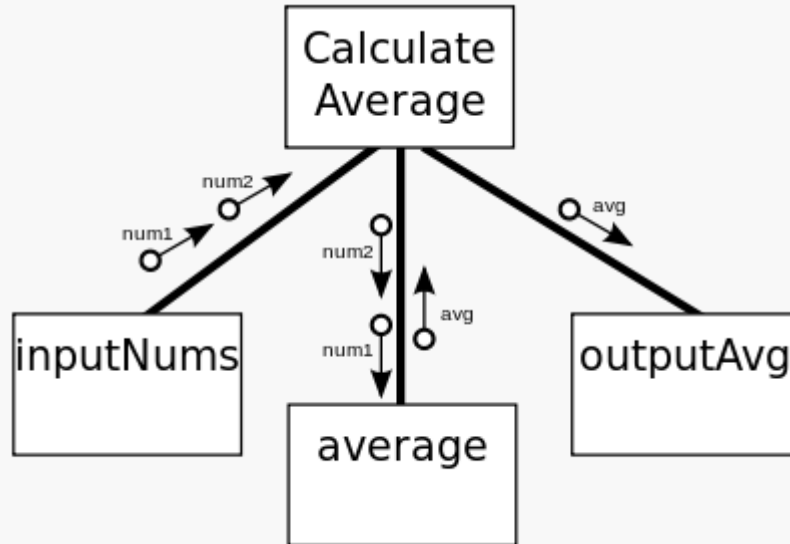
Let's take a look at a simple example of how this might be executed when representing the following code:

```
Sub calculateAverage()  
    Dim avg as integer  
    inputNums()  
    avg= average(num1, num2)  
    outputAvg(avg)  
end sub  
  
function average(a,b)  
    return(a + b)/2  
end function  
  
subinputNums()  
dim num1 asinteger  
dim num2 asinteger  
    num1 = console.readline()  
    num2 = console.readline()  
end sub  
  
suboutputAvg(x)  
console.writeline("average = "& x)  
end sub
```





Topic: 2.1.2 Structure chart



Exercise: Structure Charts

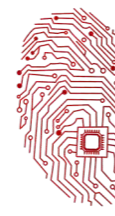
Create structure charts for the following code:

```
sub main()
dim num1 as integer
dim num2 as integer
dim avg as integer
sayHello()
  num1 = 34
  num2 = 89
avg= average(num1, num2)
end sub

function average(a,b)
return(a + b)/2
end function

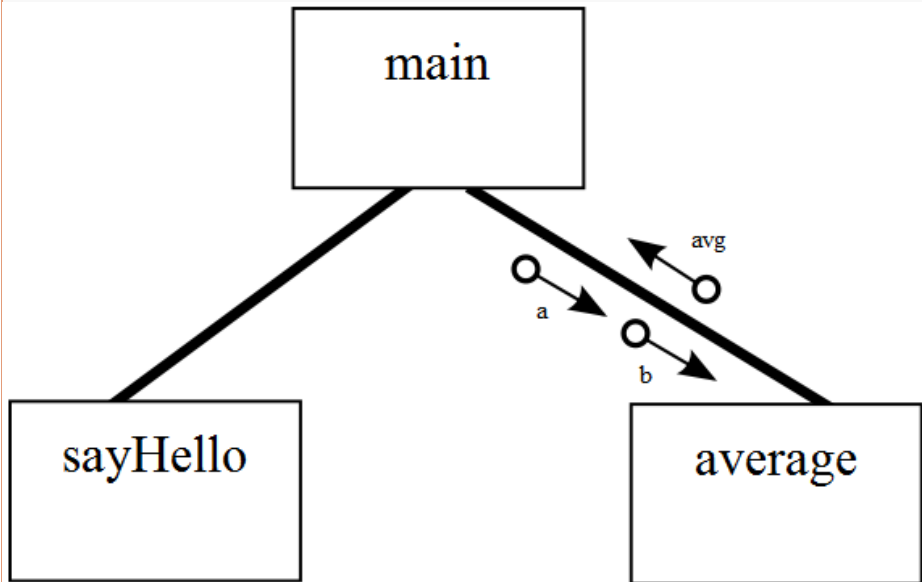
sub sayHello()
console.writeline("hello")
end sub
```





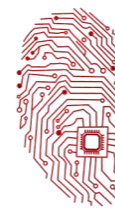
Topic: 2.1.2 Structure chart

Answer



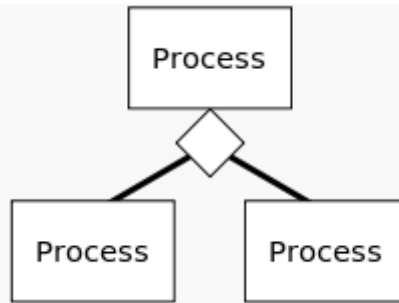
A structure chart for the above code





Topic: 2.1.2 Structure chart

Selection

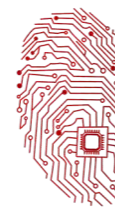


Structure Chart representation of the selection code

A selection in a Structure Chart is determined by the diamond symbol. This means a condition will be checked and depending on the result, different modules will be executed.

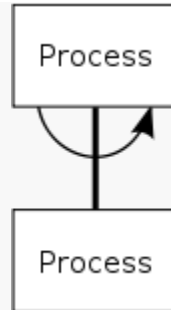
```
sub main()  
  dim num1 as integer  
  num1 = console.readline()  
  if num1 = 7 then  
    luckyNumber()  
  else  
    otherNumber()  
  endif  
end sub
```





Topic: 2.1.2 Structure chart

Iteration



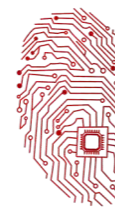
Structure Chart of the code below

Using the semicircular arrows, we can represent iteration in Structure Charts.

The arrow encompasses a link to a module, implying that module is executed multiple times. Let's take a look at a coded example:

```
sub main()  
  dim num1 as integer  
  num1 = console.readline()  
  while num1 > 0 do  
    num1 = countdown(num1)  
  end while  
end sub  
  
sub countdown(a)  
  return (a-1)  
end sub
```





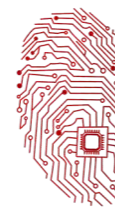
Topic: 2.1.2 Structure chart

Exercise: Structure Charts, Iteration and Selection

Create structure charts for the following code:

```
Sub howManyThrees()  
  dim num1, count, total as integer  
  num1 = startMsg()  
  count = 0  
  total = 0  
  while num1 > 0 do  
    checkNumber(count, total, num1)  
    num1 = num1 - 1  
  end while  
  endMsg(count)  
end sub  
  
sub checkNumber(byRef c, byRef t, byVal n)  
  If n MOD 3 = 0 Then  
    c = divBy3(c)  
  Else  
    t = add(n, t)  
  EndIf  
End sub  
  
function divBy3(x)  
  return x + 1  
end function  
  
function add(n, t)  
  return n + t  
end function  
  
function startMsg()  
  console.writeline("program started, enter your number")  
  return console.readline()  
end function  
  
sub endMsg(n)  
  console.writeline("number of threes : "& n)  
end sub
```





Topic: 2.1.2 Structure chart

Answer :

