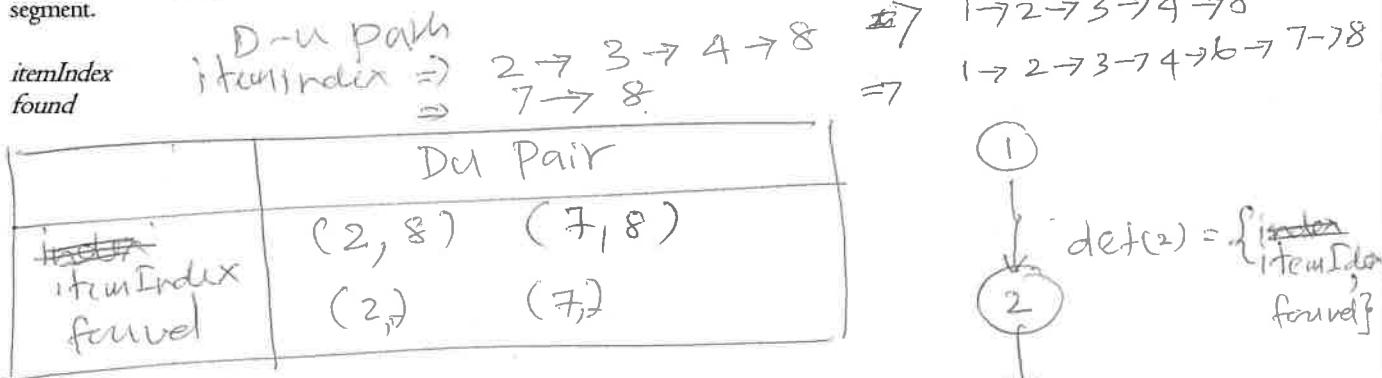**4. Data Path Testing :** Draw the control flow graph for the following SequentialSearch method. Then design test cases to test the SequentialSearch algorithm implementation.

```
int  SequentialSearch(int[] a, int searchItem)        ①
{                                                     ②
int itemIndex  = -1; Boolean found= false;
for(location = 0 ; location < a.length ; location++)
      {         ③              ④              ⑤
         if(a[location] = = searchItem) ⑥
          {
             found = true;
             itemIndex = location;    } ⑦
             break;
          }
      }
      return itemIndex;        ⑧
}
```

a) Draw Dataflow graph and then identify D-U pairs and D-U paths for following variables in the above code segment.

itemIndex
found

D-u path
itemIndex => 2 → 3 → 4 → 8
          => 7 → 8

$1 \to 2 \to 3 \to 4 \to 8$
$1 \to 2 \to 3 \to 4 \to 6 \to 7 \to 8$

	Du Pair	
itemIndex	(2 , 8)	(7 , 8)
found	(2, 7)	(7, 7)

def(2) = { itemIdx, found }

b) Design test cases based on D-U paths identified.

	Inputs		expected output (index, found)
T₁	100 , empty array	−1 , false
T₂	100, {100, 1, 200}	0, true

def(7)
= { itemIndex, found }

else(8)
{ itemIndex }