Lab Exercises

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Contents

1 Sample **2**

2 Question 4a **3**

3 Question 4b **4**

1 Sample

Data: Some input data
Result: Same for output data
`/* this is a comment */`

```
1  initialization;
2  if this is true then
3  |  we do that, else nothing;
4  |  if we agree that then
5  |  |  we do that;
6  |  else
7  |  |  else we will do a more complicated if using else if;
8  |  |  if this first condition is true then
9  |  |  |  we do that;
10 |  |  else if this second condition is true then
11 |  |  |  this is done
12 |  |  else if this other condition is true then
13 |  |  |  this is done
14 |  |  end
15 |  |  else
16 |  |  |  in other case, we do this
17 |  |  end
18 |  end
19 end
```

Algorithm 1: Algorithm to Demonstrate Different Ifs

2 Question 4a

Data: A set C=$\{c_1, c_2 \dots c_r\}$of denominations of coins where $c_1 > c_2 > \dots > c_r$ and a positive number n.
Result: A list of coins $d_1, d_2 \dots d_k$ such that $\sum_{i=1}^{k}, d_i = n$ and k is minimized.

```
1 C ← ∅;
2 for i ← 1 to r do
3 |   while n ≥ c_i do
4 |   |   C ← C ∩ {c_i};
5 |   |   n ← n − c_i;
6 |   end
7 end
8 return C;
```

Algorithm 2: makes change using smallest no. of coins

3 Question 4b

```
   Data: A sequence of integers (a_1, a_2, ..., a_n)
   Result: The index of the first location with the same value as in a
           previous location in the sequence
 1 location ← 0;
 2 i ← 2;
 3 while i ≤ n and location = 0 do
       /* Do the following if i is less than or equal to n  */
 4     j ← 1;
 5     while j < i and location = 0 do
 6         if a_i = a_j then
 7             location ← i;
 8         end
 9         else
10             j ← j + 1;
11         end
12     end
13     i ← i + 1;
14 end
15 return location;
```

Algorithm 3: FIND DUPLICATE