Example of how to use Algorithm2e

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This is how to write an algorithm (Algorithm 1) for finding the maximum element in a finite sequence (Slide 14 in Class Slides).

Algorithm 1: MAX finds the maximum number

Input: A finite set $A = \{a_1, a_2, \ldots, a_n\}$ of integers
Output: The largest element in the set

```
1 max ← a_1
2 for i ← 2 to n do
3 |   if a_i > max then
4 |   |   max ← a_i
5 return max
```

Algorithm 2 is a greedy change-making algorithm (Slide 19 in Class Slides).

Algorithm 2: CHANGE Makes change

Input: A set $C = \{c_1, c_2, \ldots, c_r\}$ of denominations of coins, where $c_i > c_2 > \ldots > c_r$ and a positive number n
Output: A list of coins $d_1, d_2, \ldots, d_k$, 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 return C
```

Algorithm 3 and Algorithm 4 will find the first duplicate element in a sequence of integers.

Algorithm 3: FINDDUPLICATE

Input: A set sequence of integers $a_1, a_2, \ldots, a_n$
Output: Location of the first value that repeats a previous value in the sequence

```
1 location ← 0
2 i ← 2
3 while i ≤ n and location = 0 do
4     j ← 1
5     while j < i and location = 0 do
6         if a_i = a_j then
7             location ← i
8         else
9             j ← j + 1
```

Algorithm 4: FINDDUPLICATE2

Input: A set sequence of integers $a_1, a_2, \ldots, a_n$
Output: Location of the first value that repeats a previous value in the sequence

```
1 location ← 0
2 i ← 2
3 while i ≤ n and location = 0 do
4     j ← 1
5     while j < i and location = 0 do
6         if a_i = a_j then location ← i
7         else j ← j + 1
```