Assignment 6 – pseudo-code

SKIPPED – you will receive full credit

This assignment is an individual activity. It asks you to interpret and write algorithms using the **pseudo-code** notation we have studied in class.

1. Read the pseudo-code below and answer the questions that follow.

```
step 1. let Y be X + 5
step 2. if Y > 0 then set X to Y * 2
step 3. set X to X * 3
step 4. output X
```

   a. Does this algorithm contain a *conditional* statement? If so, which one?

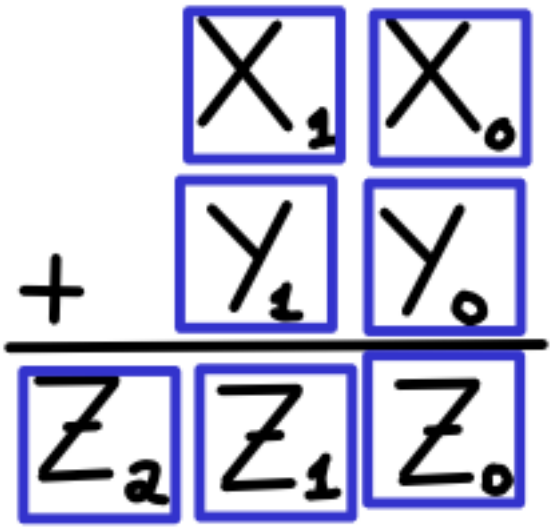
   b. Does this algorithm contain *iteration*? If so, which steps repeat?

   c. Trace the algorithm with the input X = 4. What does it output?

   d. Trace the algorithm with the input X = -3. What does it output?

   e. Trace the algorithm with the input X = -7. What does it output?

2. In this problem, you will write down an algorithm to add two-digit numbers in base ten. As shown in the figure, your input variables are X_1, X_0, Y_1, and Y_0. Each variable holds a single-digit integer.



When your algorithm is finished, the answer should be in the variables Z_2, Z_1, and Z_0 – each holding a single digit. For example, if I want to add 56+94, the algorithm will start with

```
X1 = 5    X0 = 6
Y1 = 9    Y0 = 4
```

and in the end, the Z variables will have the result:

```
Z2 = 1    Z1 = 5    Z0 = 0
```

Your algorithm should work for any single-digits provided in the input variables.

3. Here, `C` refers to a *sequence* of variables (an array), and the notation `C[I]` uses the value of `I` to determine which `C` to access.

```
step 1. set K to C[1]
step 2. set N to 1
step 3. set I to 2
step 4. if I > 7 then output N then K and stop
step 5. if C[I] = K then set N to N+1 and go to step 9
step 6. output N then K
step 7. set K to C[I]
step 8. set N to 1
step 9. set I to I+1
step 10. go back to step 4.
```

Below are the initial values of the array, and other variables you will use.

```
   K :
   N :
   I :
C[1] : apple
C[2] : apple
C[3] : banana
C[4] : carrot
C[5] : carrot
C[6] : carrot
C[7] : date
```

What is the output of the algorithm?