

12. (a) By **copying** the table below, trace the following algorithm using the data in the collection DATA. **Note:** B and C are also collections and are initially empty.

```
DATA = {2, 4, -1, 3}
loop while DATA.hasNext()
  A = DATA.getNext()
  if A >= 0 then
    if A mod 2 = 0 then
      B.addItem(A)
    else
      C.addItem(A)
    end if
  end if
end loop
```

DATA.hasNext() ?	A	A >= 0?	A mod 2 = 0?	Contents of B	Contents of C

[3]

12. (a) The collection DATA contains the following data:

2, 4, 1, -2, -4, 1, 0

Consider the following pseudocode:

```
COUNTER = 0
SUM = 0
DATA.resetNext()
loop for X from 0 to 6
  if DATA.getNext() > 0
    ARRAY[X] = DATA.getNext()
    COUNTER = COUNTER + 1
    SUM = SUM + ARRAY[X]
  end if
end loop
output SUM/COUNTER
```

Trace the pseudocode using the table below:

[4]

X	ARRAY[X]	COUNTER	SUM	output

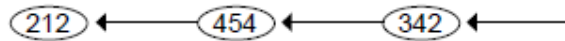
A transport authority is investigating how many people use a certain direct train route, which is used every day of the week.

At the end of each day, the total number of passengers who travelled on this route is stored in a collection, `PASSENGERS`.

The first item was written to the collection on Monday 1st January 2018.

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The next items, collected on Tuesday and Wednesday, were added like this:



- (b) Assuming that the first item read from the collection is from Monday 1st January 2018, construct pseudocode that will read `PASSENGERS` into an array, `P_ARRAY`. [4]
- (c) Using `P_ARRAY`, construct pseudocode to output the day of the week with the highest average number of passengers. Use the sub procedure `convert()` which converts the numbers 0 to 6 into days of the week, for example `convert(1)` will return "Tuesday".

Note: you should not assume that data for an exact number of weeks is stored. [7]

Collection `NUMBERS` already exists and stores real numbers.

- (d) Construct in pseudocode an algorithm, using the access methods of a collection, which will iterate through the collection `NUMBERS` and count how many elements stored in the collection are in the interval $[-1, 1]$.

The final answer should be output. [6]