Solutions to Quiz 3 (4th March 2025)

Question 1

A *stack* currently has the following structure

$$\text{top} \rightarrow [1, 2, 3, 4] \leftarrow \text{bottom}$$

What will be the resulting stack if the following code is run in the given sequence:

```
push( pop() + pop())
push( pop() - pop())
push( pop() / pop())
```

Solution

The operation `pop` takes from the top of the stack and the operation `push` puts on the top of the stack.

1. First line does `push( 1 + 2)` so the resulting stack is $[3, 3, 4]$.
2. Second line does `push( 3 - 3)` so the resulting stack is $[0, 4]$.
3. Third line does `push( 0 / 4)` so the resulting stack is $[0]$.

Question 2

A *queue* currently has the following structure

$$\text{head} \rightarrow [1, 2, 3, 4] \leftarrow \text{ tail}$$

What will be the resulting queue if the following code is run in the given sequence:

```
enqueue( dequeue() + dequeue())
enqueue( dequeue() - dequeue())
enqueue( dequeue() / dequeue())
```

Solution

The operation `dequeue` takes from the head of the queue and the operation `dequeue` puts at the tail of the queue.

1. First line does `enqueue( 1 + 2)` so the resulting queue is $[3, 4, 3]$.
2. Second line does `enqueue( 3 - 4)` so the resulting queue is $[3, -1]$.
3. Third line does `enqueue( 3 / (-1))` so the resulting queue is $[-3]$.