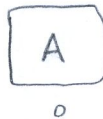## 1.4   Questions: Queues

Question 1   ——— / 2
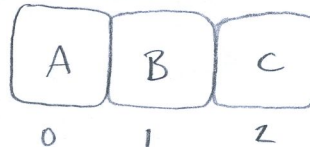
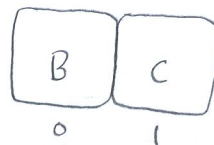Draw a **queue** structure at each step:

1. Push("A");

   A
   0

2. Push("B");

   A B
   0 1

3. Push("C");

   A B C
   0 1 2

4. Pop();

   B C
   0 1

5. Push("D");

   B C D
   0 1 2

Question 2   ——— / 2

For the following queue, write out code commands for the queue (e.g., Push("..."), Pop(), or Front()) to access element "D". Write in a linear order. At the end of your steps, the Front() function should return the requested item.

0	1	2	3	4	5
A	S	D	F	G	H

Pop(); // removes A
Pop(); // removes S
Front(); // returns D

Question 3 _____ / 2

For each set of commands, what will be returned by the Front() function after all the commands have been executed?

a. Push('A'); Push('B'); Push('C');   A B C

   Front() returns ____A____

b. Push(2); Push(3); Push(4); Pop(); Push(5); Push(6);   ~~2~~3 4 5 6

   Front() returns ____3____

c. Push(0); Pop(); Push(1); Push(2); Pop(); Push(3); Push(4);   ~~0~~ ~~1~~ 2 3 4

   Front() returns ____2____

Question 4 _____ / 1

Give at least one example of how a queue may be used in computer science. Try to find an example online if you can't think of anything. If you can't find any good examples of software uses for programming, think of other technology/engineering fields and given an example.

- Rendering a sequence of frames in animation software. The first frame renders first, followed by the next, and so forth.

- Printing documents on a printer. The first page prints first, followed by the second page, and so forth.
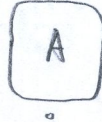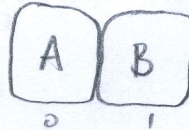

1.5   Questions: Stacks

Question 5   _____ / 2

Draw a **stack** structure at each step:
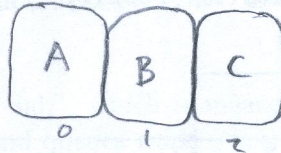
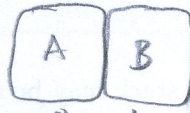1. Push("A");

2. Push("B");
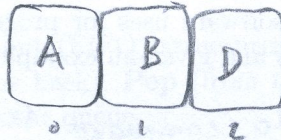
3. Push("C");

4. Pop();

5. Push("D");

Question 6   _____ / 2

For the following stack, write out code commands for the queue (e.g., Push("..."), Pop(), or Top()) to access element "D". Write in a linear order. At the end of your steps, the Front() function should return the requested item.

0	1	2	3	4	5
A	S	D	F	G	H

Pop(); // removes H

Pop(); // removes G

Pop(); // removes F

Top(); // returns D

Question 7   ____ / 2
For each set of commands, what will be returned by the Top() function after
all the commands have been executed?

   a. Push('A'); Push('B'); Push('C');   *A B C*

     Top() returns ___*C*___

   b. Push(2); Push(3); Push(4); Pop(); Push(5); Push(6);   *2 3 4̶ 5 6*

     Top() returns ___*6*___

   c. Push(0); Pop(); Push(1); Push(2); Pop(); Push(3); Push(4);   *0̶ 1 2̶ 3 4*

     Top() returns ___*4*___

Question 8   ____ / 1
Give at least one example of how a stack may be used in computer science.
Try to find an example online if you can't think of anything. If you can't
find any good examples of software uses for programming, think of other
technology/engineering fields and given an example.

     · An undo command that allows the user
     to cancel the previously entered command.

     · A back button on a browser.