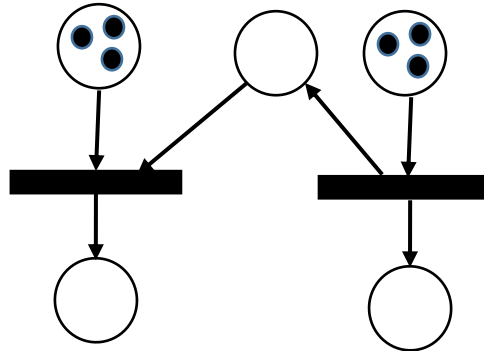


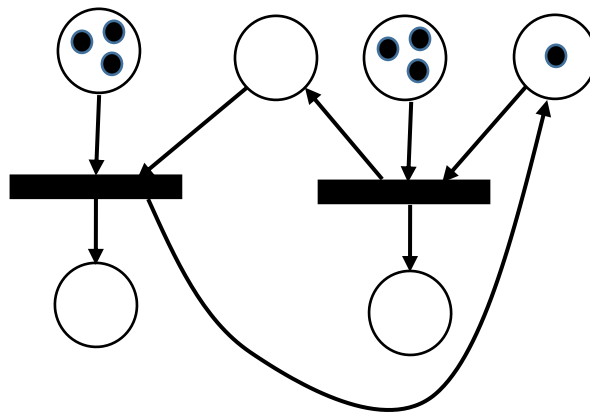
## Tutorial 7 – Petri nets

1. Make sure you understand the petri net structures in the lecture slides.
2. Draw the sequence of events in the following example:

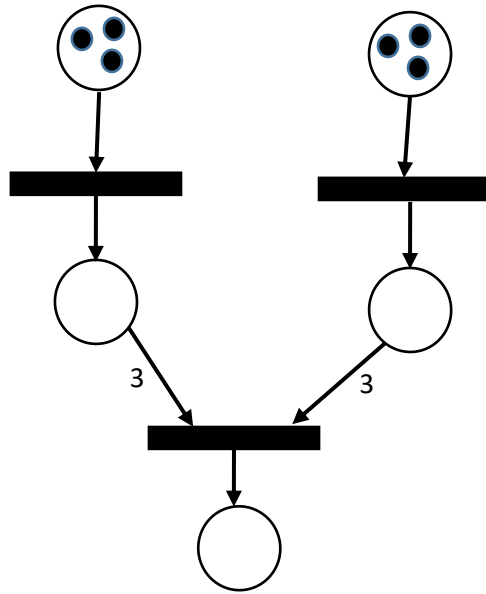


Could the above petri net produce more than one sequence?

3. Draw the sequence of events in the following example, how does it differ from the sequence produced in 2.

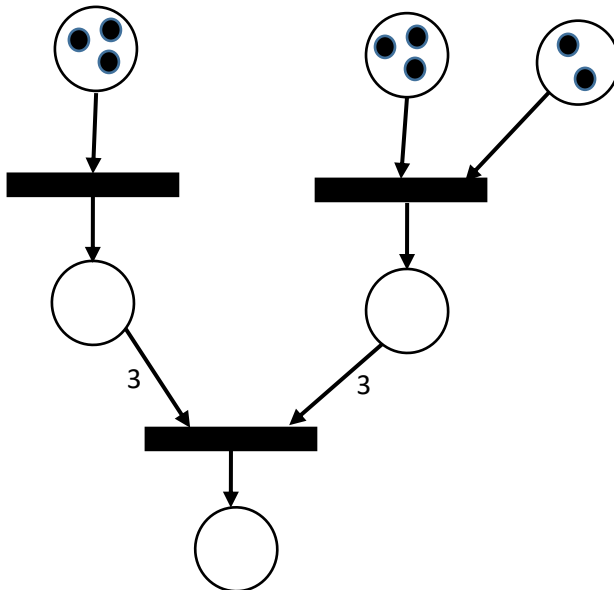


4. Draw the sequence of events in the following petri net:



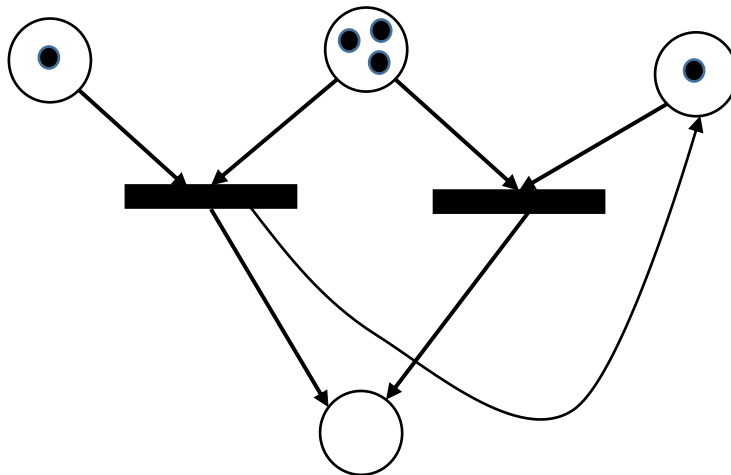
What is your interpretation of this Petri net? What does the system represent in terms of concurrent programming?

5. Draw the sequence of processes for the following Petri net:



Will the last place get populated, if not why not?

6. Draw the sequence for the following petri net:



How many tokens reach the final place?

For the following questions you will be asked to model a program. Make sure you provide the initial marking and also describe what each part of the model does.

7. Use a petri net to model the following program:

A program has a data block containing 5 items to be consumed. A place should be used to model the data block and tokens to represent the items.

A place should also be used to represent an item being processed.

Finally, a place should be used to store all data items that have been consumed.

The program should ensure that only one data item can be consumed at a given time.

8. Extend the above program so that the items in the data block can be consumed by two concurrent processes. The items must end up in the same place once processed.

9. Extend the program in 7 so that data from another data block that contains 3 items can also be consumed, whilst maintaining that only one item is only processed at a time. There should be no preference as to what data block is processed first and all data should end up in the same place.

10. Extend the above program to process the two data blocks using two concurrent processes:

- a. The first solution should ensure the data from each data block is only processed by one of the processes (hint: this is the easy version).

- b. The second solution should allow data from either block to be processed by either process (hint: this is the hard version).**