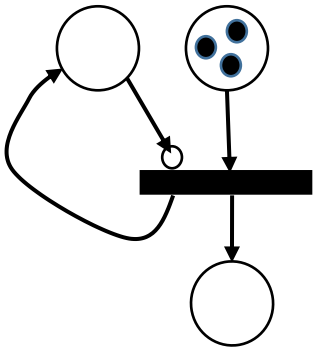
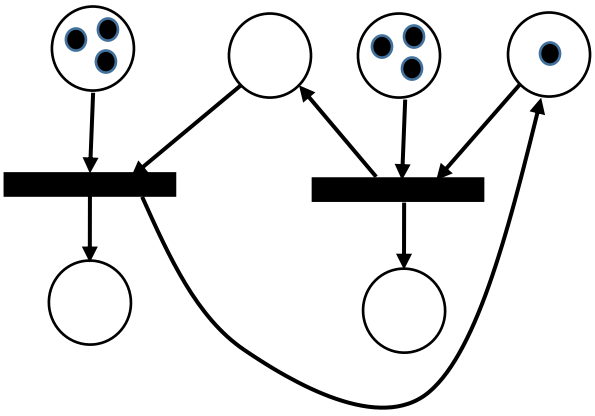
Tutorial 8 – More Petri nets

1. **Make sure you understand the petri net structures in the lecture slides.**

2. **Draw the sequence of events in the following example:**



3. **Modify the example from last week (shown below) to produce the same output but using inhibitor arcs.**



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. They are the same as last week try them again but this time feel free to use inhibitor arcs.

4. **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.

5. **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.**

6. **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.**

7. **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).**

8. **Are your diagrams easier or more complicated using inhibitor arks? How would you implement an inhibitor ark to create a critical section? Does it make sense?**

9. **You are modelling a system that will be used in an egg processing depot. The system is as follows: Eggs are produced at intervals between 30 and 60s, the eggs are temporarily stored in a hopper. Eggs are moved from the hopper into an inspection area which takes between 5 and 10 seconds. Only one egg can be inspected at a time. If an egg is good it is moved into a storage area containing only good eggs, this takes 10 to 15 seconds. If an Egg is bad it is moved into a bad storage area which takes between 100 and 120 seconds (this takes longer since the inspection area may need to be cleaned before inspecting anymore eggs). Another egg cannot be moved into the inspection area until the inspected egg is move out of the inspection area is complete.**

    a) **Draw a Petri Net of the above system.**
    b) **If a good egg is produced at intervals of 30 seconds what is the lowest amount of time the system is idol between processing eggs?**
    c) **If a good egg is produced at intervals of 60 seconds what is the largest amount of time the system may be idol between processing eggs?**
    d) **If a bad egg is produced at intervals of 30 seconds what is the largest amount of time the next egg produced will be delayed from being moved into the inspection area?**
    e) **If a bad egg is produced at intervals of 60 seconds what is the smallest amount of time the next egg produced will be delayed from being moved into the inspection area?**
    f) **What is the maximum ratio of bad to good eggs the system can manage?**
    g) **Under what circumstances could the system manage a ratio of good to bad eggs of 1:1?**