COMP SCI 7411 Event Driven Computing Practice 3 Plan

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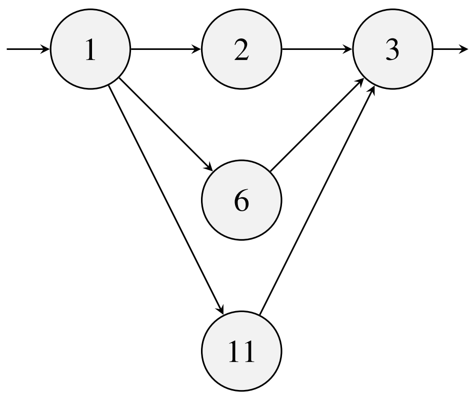
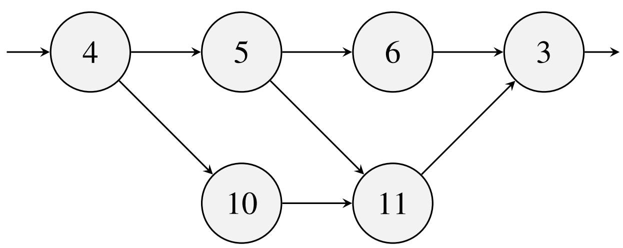
Due to the constraint that train will not change direction, the following routes are the only options for trains entering the system.

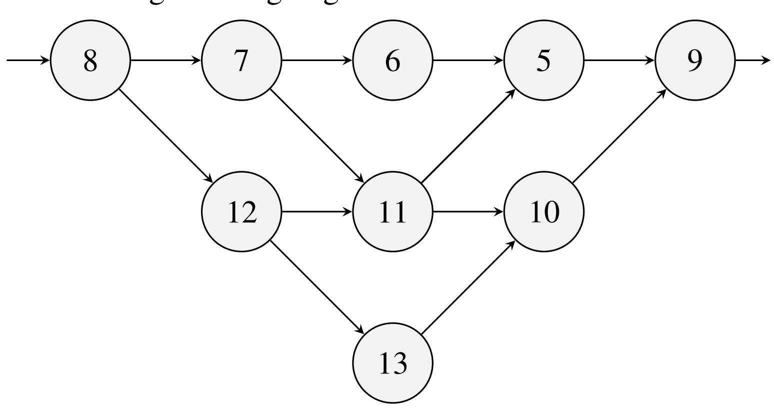
- Train entering from 1 going east



- Train entering from 4 going east



- Train entering from 8 going west



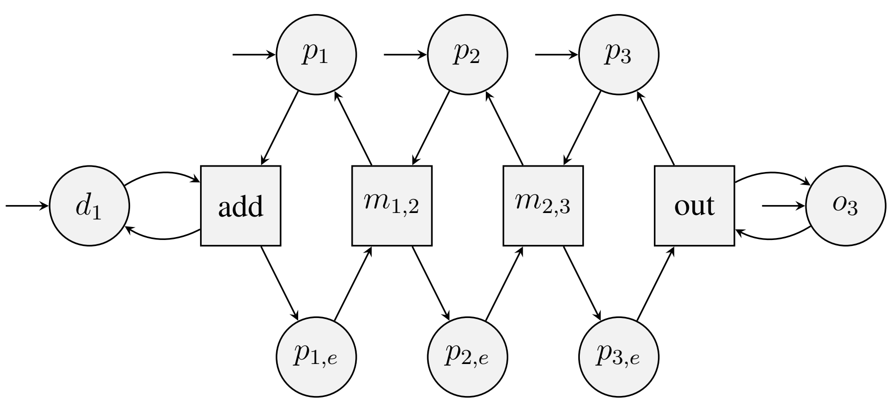
In the following sections, I will use the following notations in the Petri Net, where in the Petri Net tuple $N = (P, T, A, W, I)$

- (P) p_i refers to track i when it's empty. $p_{i,e}$ or $p_{i,w}$ refers to track i with a east direction (e) or west direction (w) train on it. This is a necessary notation to avoid deadlock. All p_i with $p_{i,e}$ and $p_{i,w}$ forms different buffers in the Petri Net.
- (P) d_i refers to a dispatcher, where only d_1, d_4 and d_8 are available as trains can only enter the system from these tracks. They also act as producers in the Petri Net as well.
- (P) o_i refers to the outgoing track, where only o_3 and o_9 are available as trains can only exit the system from these tracks. They also act as consumers in the Petri Net as well.
- (T) $e_{i,j}$ or $w_{i,j}$ refers to a move from track i to track j in the direction of east (e) or west (w).
- W will always be one for all transitions.
- (I) All p_i, d_i and o_i will be an initial states as implied by the definition of producer, consumer and buffer. It is also obvious that the initial system will be completely empty, so the initial state should be neither $p_{i,e}$ nor $p_{1,w}$ but p_i.

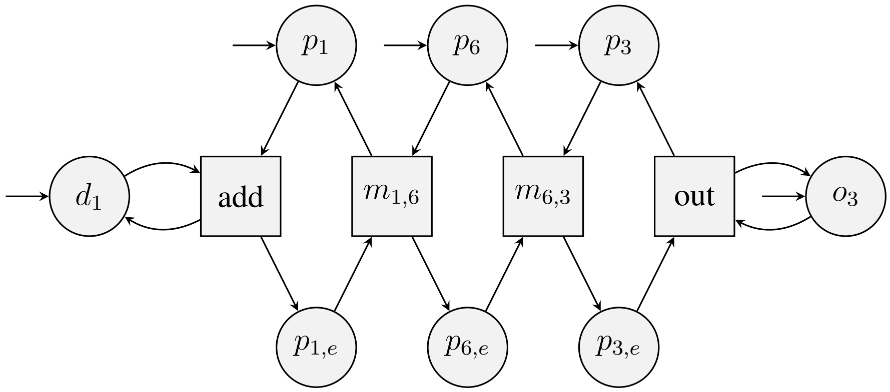
1 Entering from 1

There will be no chance of deadlock in any routes available for train entering from 1, as the intermediate tracks 2, 6 and 11 can reach the outgoing track 3 directly. The only requirement for the move is that the destination track needs to be empty.

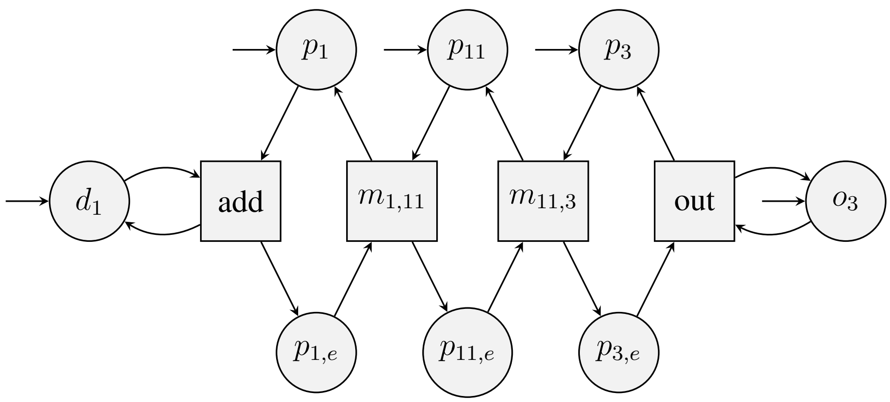
1.1 $1 \rightarrow 2 \rightarrow 3$



1.2 $1 \to 6 \to 3$



1.3 $1 \to 11 \to 3$



2 Entering from 4

3 Entering from 8