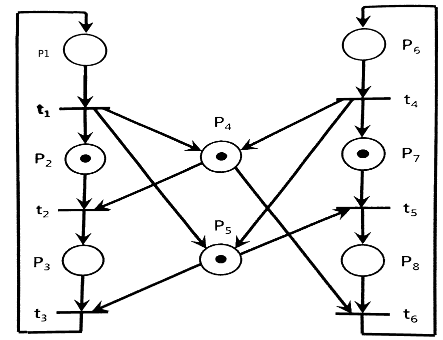
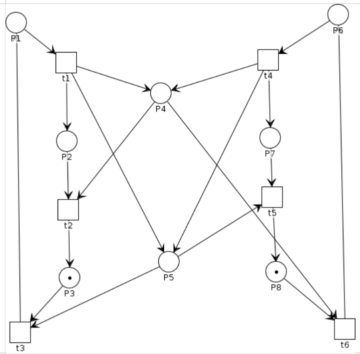
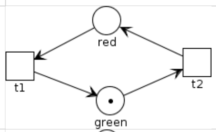
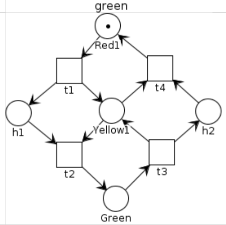
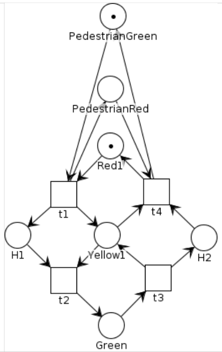
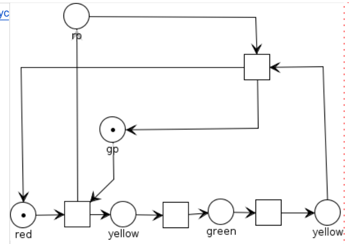
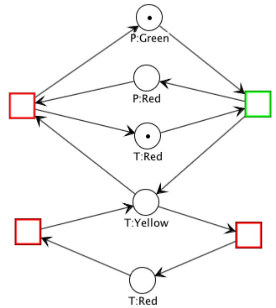
Aufgabe	Lösung	
Page 2		
a) important requirements for of real-time systems (!sic)	- Predicability - Reliability - Minimal Delay/Latency - Correctness and Execution time of the results are guaranteed	
b) Name the three types of hardness of real-time systems and make a short explanation. Give an example for each.		
1.	Hard Realtime: Missing a deadline is a total system failure (airbag in car).	
2.	Soft Realtime: The usefulness of a result degrades after its deadline, therby degrading the system's quality of service (warning systems).	
3.	Firm Realtime: "Infrequent deadline misses are tolerable but may degrade the system's quality of service. The usefulness of a result is zero after its deadline. (car: ignition-point-optimizer for motor)"	
c) Specifiy three criteria (not those of b) to classify real-time systems:	Consequence of missing deadline Relaibilty and fault tolerance Distribution: centralised or distributed RTS Interactive or autonomic system Hierarchical or flag system Time-driven or event-driven RTS Cyclic or asynchronous scheduling	
Page 3		
i		Files for PNeditor
		https://drive.google.com/file/d/0B5FaJbImIPdOc2lxbHVRcXRrXzg/view?usp=sharing
Page 4		
a) prepare a **detailed** reachability graph with all places!	A) S: (p1: 0;p2: 1;p3: 0;p4: 1;p5: 1;p6: 0;p7: 1;p8: 0) t2: (p1: 0;p2: 0;p3: 1;p4: 0;p5: 1;p6: 0;p7: 1;p8: 0)	B) S: (p1: 0;p2: 1;p3: 0;p4: 1;p5: 1;p6: 0;p7: 1;p8: 0) t5: (p1: 0;p2: 1;p3: 0;p4: 1;p5: 0;p6: 0;p7: 0;p8: 1)
	a) t3: (p1: 1;p2: 0;p3: 0;p4: 0;p5: 0;p6: 0;p7: 1;p8: 0) t1=S: (p1: 0;p2: 1;p3: 0;p4: 1;p5: 1;p6: 0;p7: 1;p8: 0) ALIVE b) t5: (p1: 0;p2: 0;p3: 1;p4: 0;p5: 0;p6: 0;p7: 0;p8: 1) DEAD	a) t2: (p1: 0;p2: 0;p3: 1;p4: 0;p5: 0;p6: 0;p7: 0;p8: 1) DEAD b) t6: (p1: 0;p2: 1;p3: 0;p4: 0;p5: 0;p6: 1;p7: 0;p8: 0) t4=S: S: (p1: 0;p2: 1;p3: 0;p4: 1;p5: 1;p6: 0;p7: 1;p8: 0) ALIVE
b) verify or falsify the following properties! Underline your result and give a short argument.		
is alive / is not alive	dead: after firering t5+t2 or t2+t5 it will be deadlocked.	
safe / is not safe	safe: does not contain more than 1 token in all reachable places	
all places are reachable / some places are not reachable	All places are reachable, if the net is not in dead-lock (t5+t2 | t2+t5).	
Page 5		
1. Consider a Petri net for traffic lights (do not care about times of the traffic-lights)		
a) Please model a Petri-Net that represents the different statuses of traffic lights for pedestrians. It has two states: <red> and <green>.		https://drive.google.com/file/d/0B5FaJbImIPdOM0JaYkNqdGhGUE0/view?usp=sharing
b) Please model a Petri-Net that represents the different statuses of traffic lights for automotive-traffic. It has three states: <red>, <yellow> and <green>. The switching sequence is <red> to <yellow> to <green> to <yellow> to <red>. There is one color only at a time.		https://drive.google.com/file/d/0B5FaJbImIPdOTTlFYXZnODhmMFk/view?usp=sharing

2. Combine the two Petri-Nets of a) and b) in that way that pedestrians have <green> only when the automative traffic has <red>. (Make them mutual exclusive).		https://drive.google.com/file/d/0B5FaJbImIPdOWEpycUtuYkdoWjA/view?usp=sharing			<-- Glaube nicht, dass das stimmt..