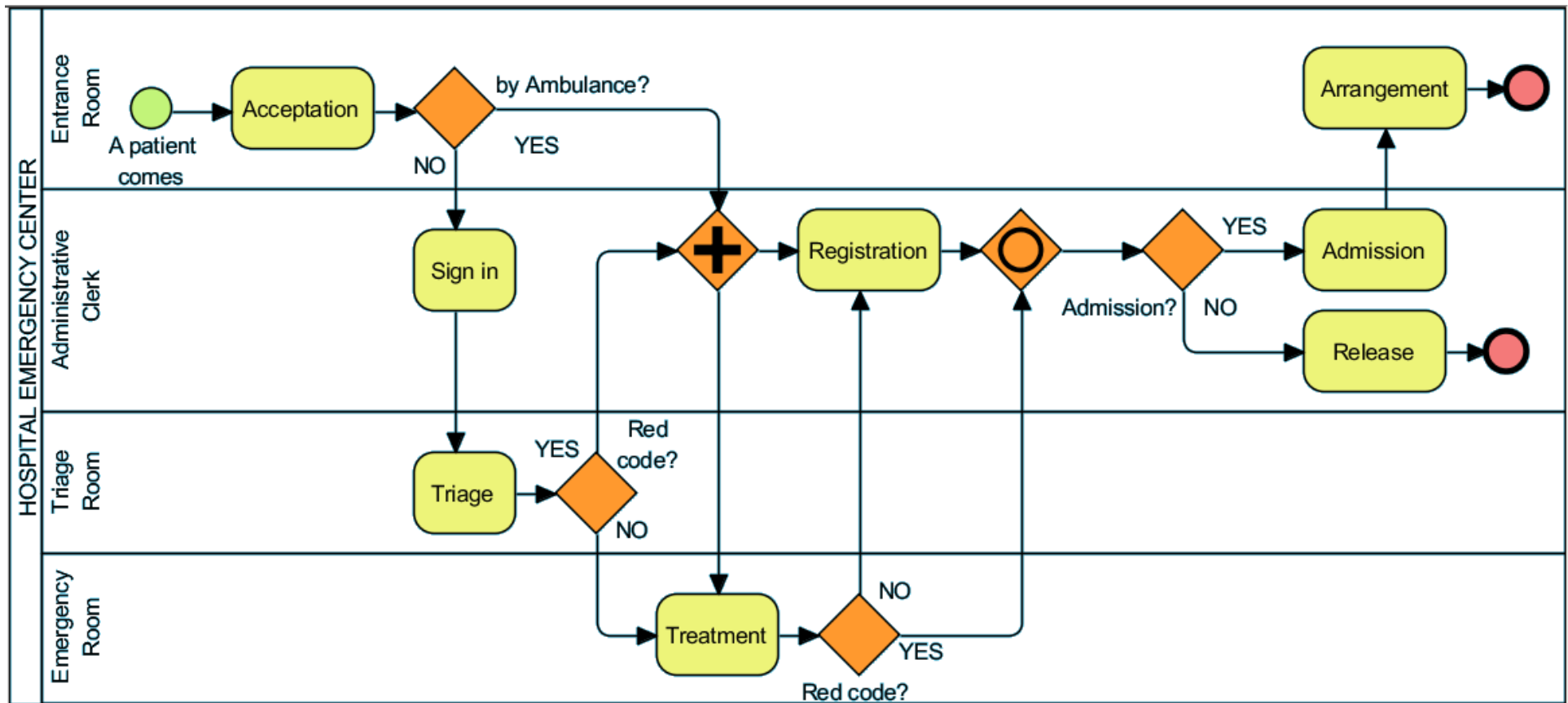


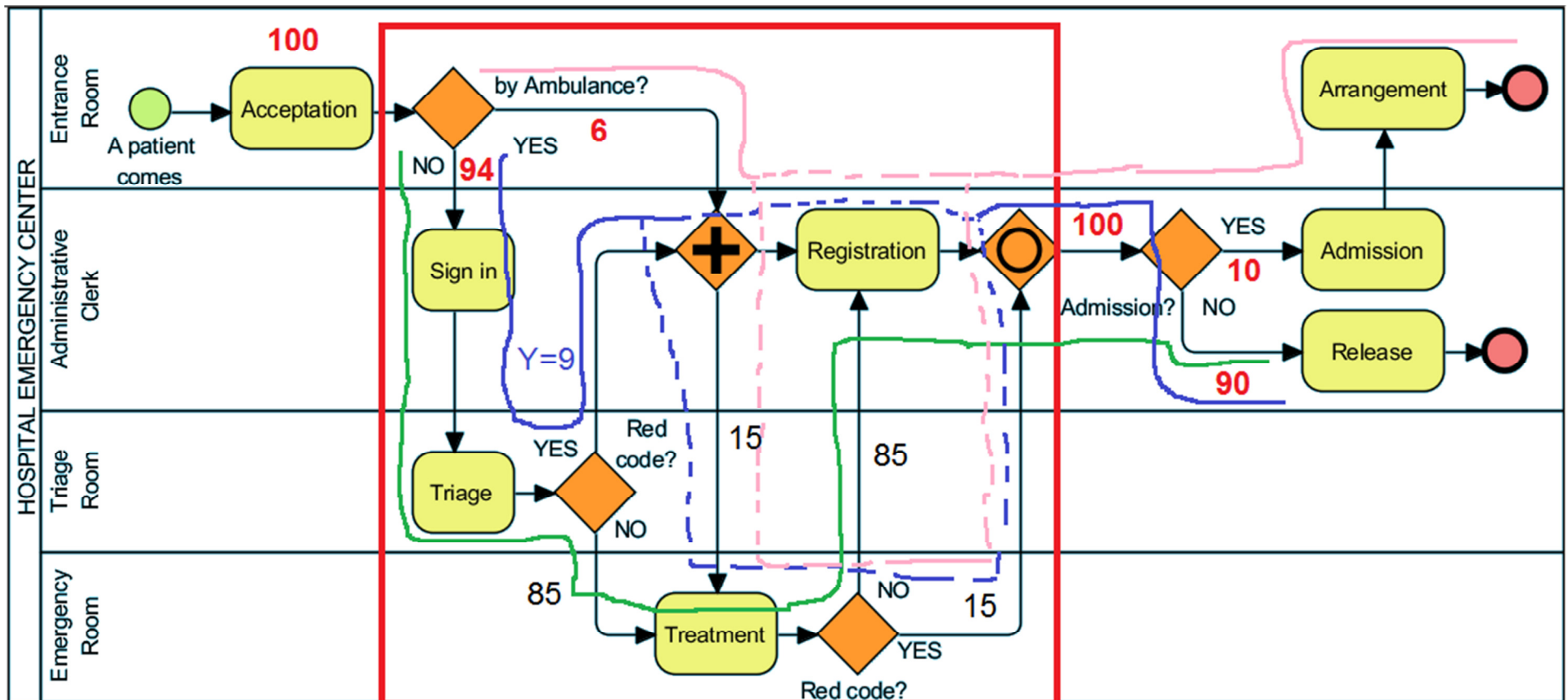
## Selecting the best configuration for a Hospital Emergency Center – Part d-e

- An example of redesign.



- The number of tokens for each scenario can be calculated with the methodology already employed in the first model.

- This model **cannot be simulated**, because the tool does not allow the definition of scenarios with multiple paths at the parallel gateway, and with the inclusive merge node. An **emulation model** must be performed.



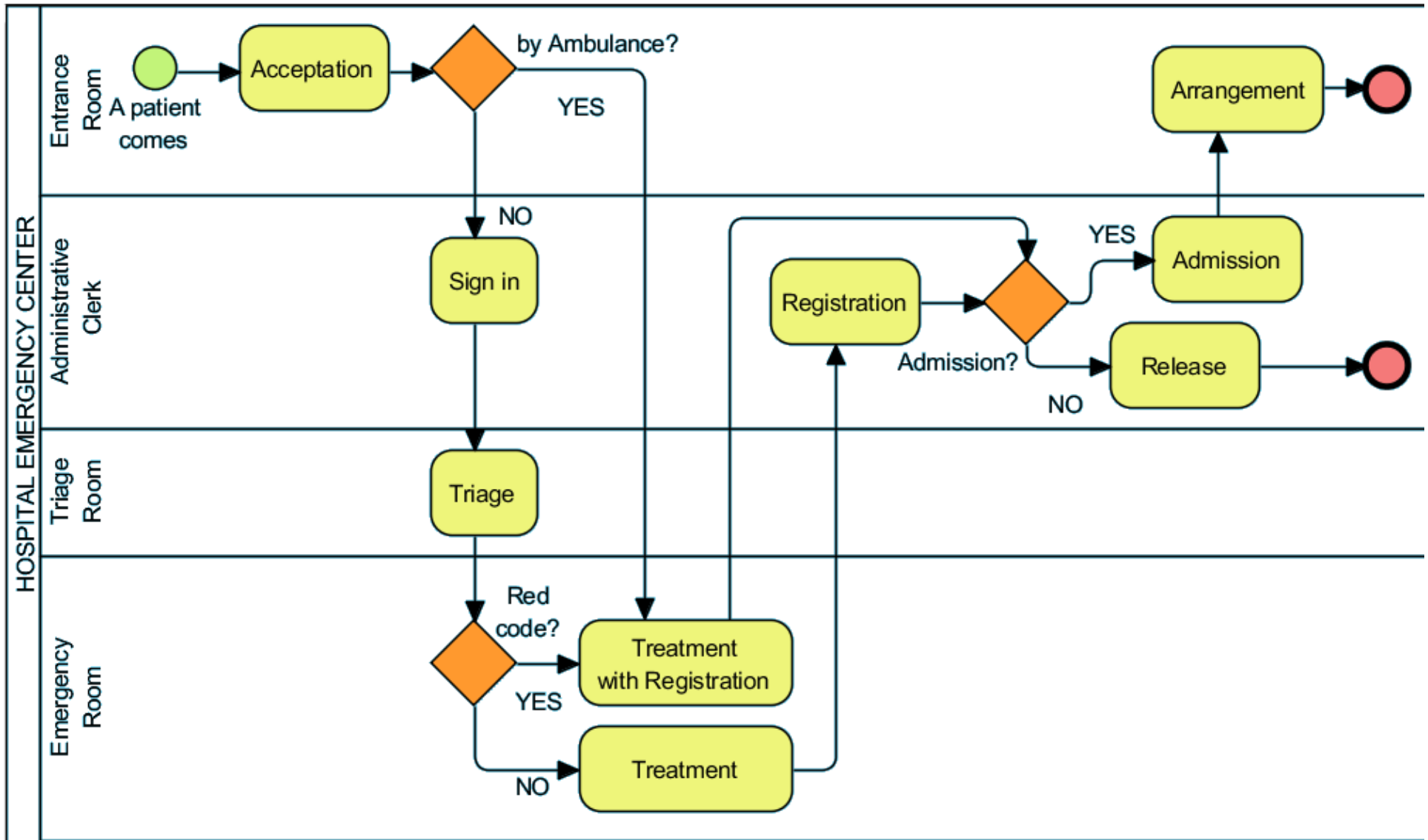
AMB -> RED CODE

TOT RED: 6+Y=15

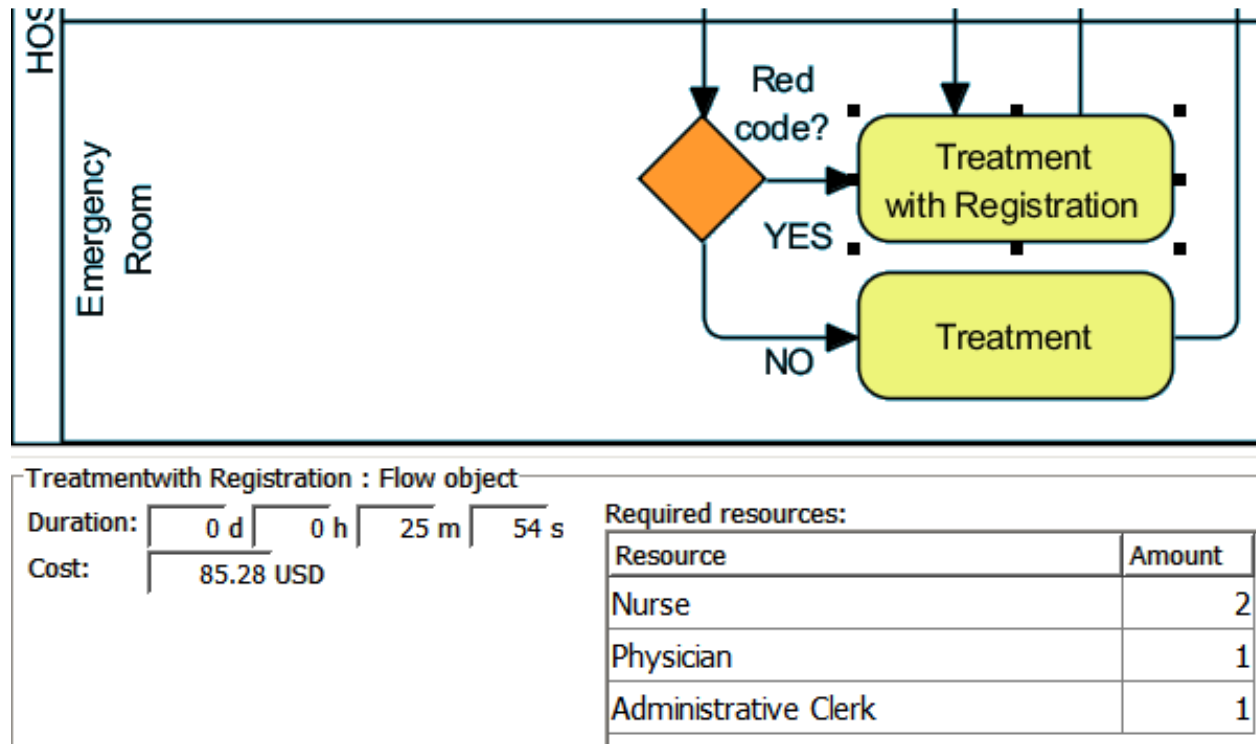
-> Y = 9

- 1) OWN & NORED & REL -> 94 & 85 & 85\*0.9 = 77
  - 2) OWN & RED & REL -> 94 & 9 & 9 \* 0.9 = 8
  - 3) OWN & NORED & ADM -> 94 & 85 & 85\*0.1 = 8
  - 4) OWN & RED & ADM -> 94 & 9 & 9\*0.1 = 1
  - 5) AMB & RED & ADM -> 6 & 6 & 6\*0.1 = 1
  - 6) AMD & RED & REL -> 6 & 6 & 6\*0.9 = 5
- 90  
10

- An emulation model. The model is **redundant**, because there are two occurrences of Registration and Treatment tasks. The activity Treatment-with-Registration is an emulation of the parallelism between the two activities.



- Treatment-with-Registration:  
 Duration = the maximum of the durations (of Treatment and Registration)  
 Resource = the union of the resources  
 Cost = the sum of the costs

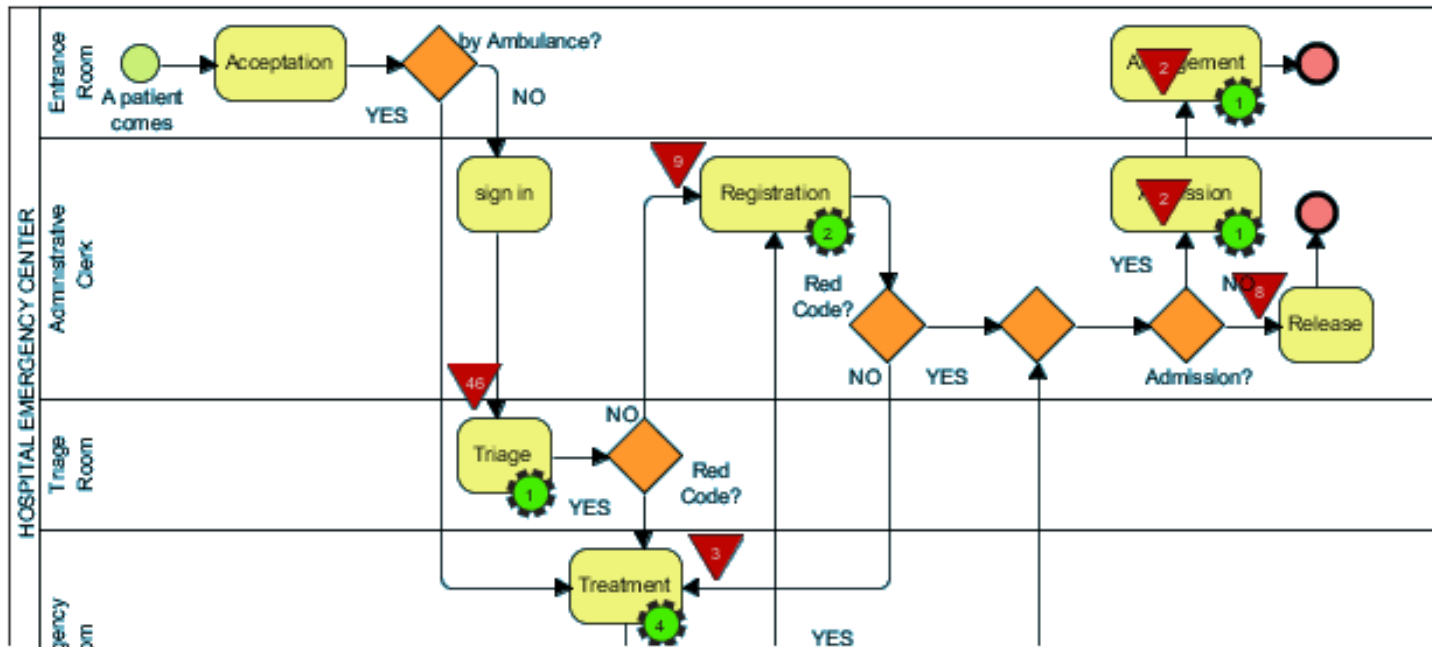


- Total duration and cost in the emulation model: 17h 31m 54s 10037\$.
- The total duration is higher than the duration of the simulation model (17h 21m 12s). Explain the reason.

## Solution

- The emulation model requires more human resources to be experimented, because it exploits parallelism in the Emergency Room.
- Compare both models as follows:

MODEL	RESOURCES	RESULTS	COMMENTS
Simulation	4 Physicians 4 Emerg. Rooms	14h 45m 18s 10037\$	The maximum number of parallel execution in Emergency Room is still 3. Why? Because 8 Nurses are needed, instead of 7.
Simulation	4 Physicians 4 Emerg. Rooms 8 Nurses	13h 04m 12s 10037\$	
Simulation (best)	20 Units of each human resource	<b>11h 23m 36s</b> 10037\$ <b>Tot avg Time</b> <b>6,18</b> <b>Tot Costs</b> 55800*5+ 13200*4+ 10037 = <b>341837\$</b>	Theoretical experiment, with infinite human resources. It is used to assess the resources actually needed: 9 Nurses, 5 Phys, 4 Tech, 4 Adm, 5 Med Room, 4 Adm Room. Start-End Completion time per scenario: (1) 2:20-11:25; (2) 3:20-4:30; (3) 3:08-6:10; (4) 4:00-4:00; (5) 2:45-2:45; (6) 2:26-3:20.



### Scenarios

Name	Processing	Cases
OWN & NORED & REL	7	71
OWN & RED & REL	0	2
OWN & NORED & ADM	2	6

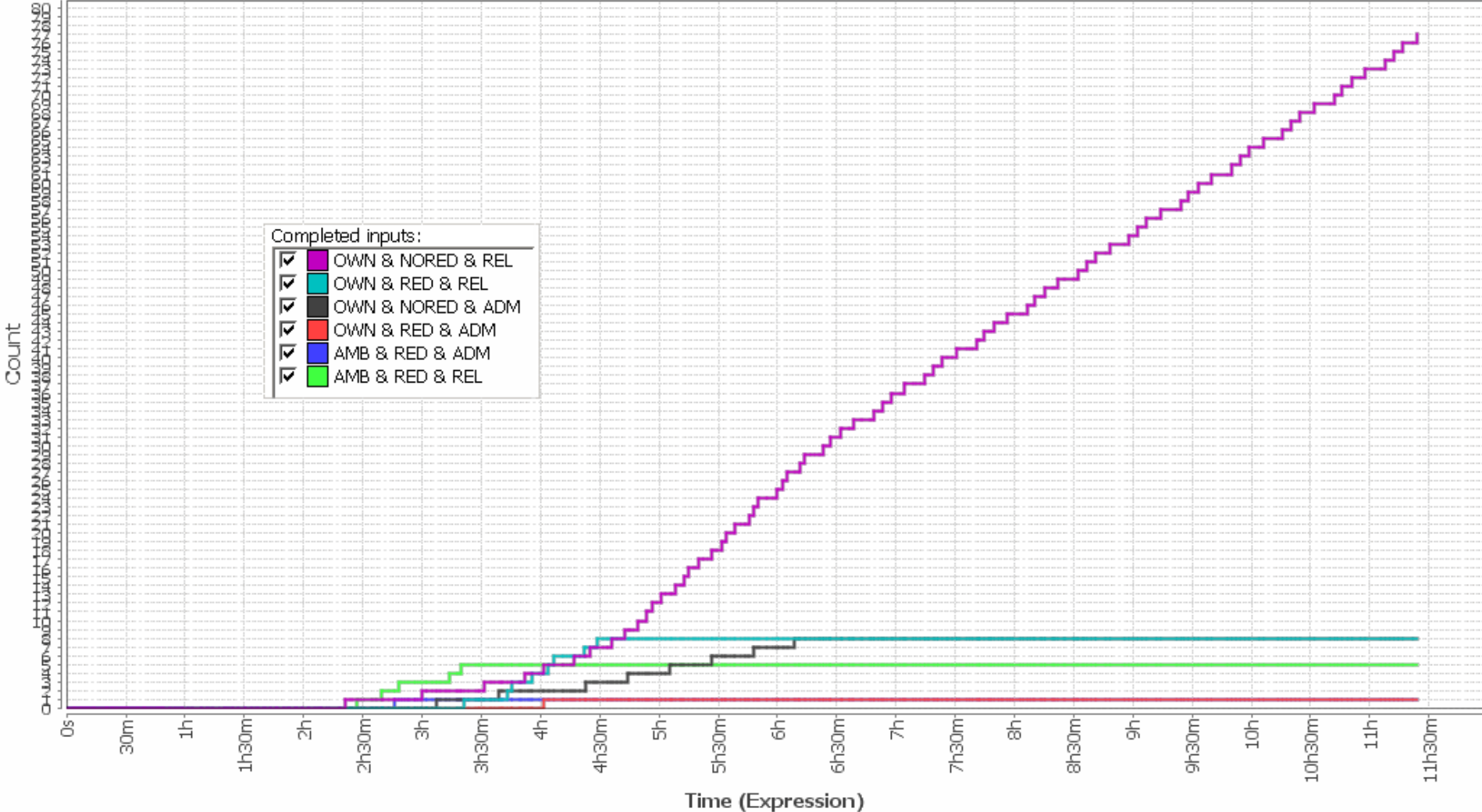
### Results

Name	Cases
OWN & NORED & REL	6
OWN & RED & REL	6
OWN & NORED & ADM	2
OWN & RED & ADM	1
AMB & RED & ADM	1
AMB & RED & REL	5

### Resources

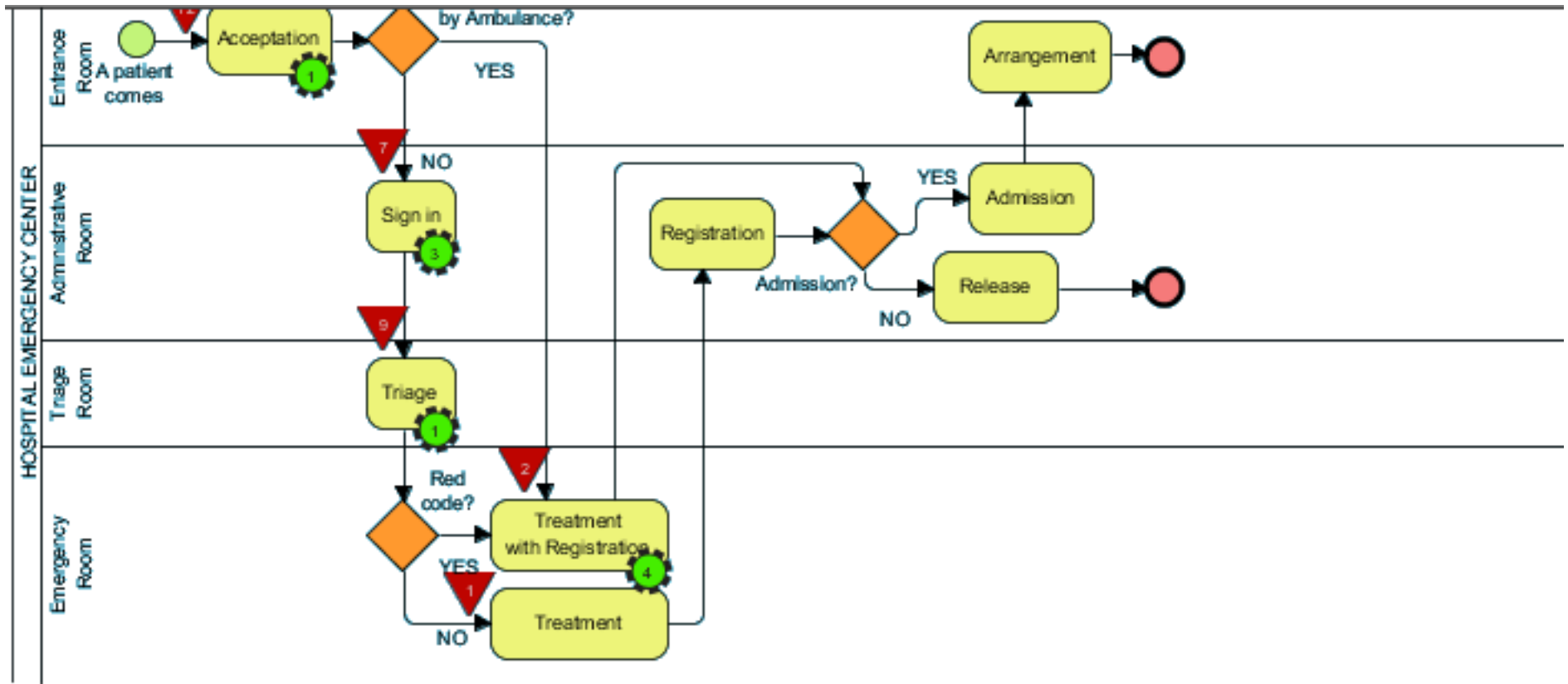
Name	Type	Processing	Cases
Nurse	Staff	9	20
Physician	Staff	5	20
Technician	Staff	4	20
Administrative C...	Staff	4	20
Medical Room	Room	5	7
Administrative R...	Room	4	13
Emergency Room	Pool/Lane	4	4
Triage Room	Pool/Lane	1	1
Administrative ...	Pool/Lane	3	3
Entrance Room	Pool/Lane	1	1

# Completion



<b>MODEL</b>	<b>RESOURCES</b>	<b>RESULTS</b>	<b>COMMENTS</b>
Emulation	4 Physicians 4 Emerg. Rooms	14h 56m 30s 10037\$	The maximum number of parallel execution in Emergency Room is still 3. Why? Because 8 Nurses are needed, instead of 7.
Emulation	4 Physicians 4 Emerg. Rooms 8 Nurses	13h 17m 48s 10037\$	
Emulation (best)	20 Units of each human resource	<b>11h 11m 12s</b> 10037\$ <b>Tot avg Time</b> <b>5,75</b> <b>Tot Costs</b> 55800*4+ 13200*4+ 10037 = <b>286037\$</b>	Theoretical experiment, with infinite human resources. It is used to assess the resources actually needed: 9 Nurses, 5 Phys, 4 Tech, 8 Adm, 4 Med Room, 4 Adm Room. Start-End Completion time per scenario: (1) 2:09-11:12; (2) 1:49-3:32; (3) 2:34-5:02; (4) 2:12-2:12; (5) 1:18-1:18; (6) 0:58-1:40.





Scenarios

Name	Processing	Cases
OWN & NORED & REL	1	77
OWN & RED & REL	2	8
OWN & NORED & ADM	2	8
OWN & RED & ADM	0	1
AMB & RED & ADM	1	1
AMB & RED & REL	3	5

Resources

Name	Type	Processing	Cases
Nurse	Staff	9	20
Physician	Staff	5	20
Technician	Staff	4	20
Administrativ...	Staff	8	20
Medical Room	Room	4	7
Administrativ...	Room	4	13

# Completion

