1 Data

Table 1: List of Global Variables

Name	Description	Initial Value
NextPatIdNum	The Id number that will be assigned to the next patient	1
NextReceptionistIdNum	The Id number that will be assigned to the next receptionist	1
NextCTMachineIdNum	The Id number that will be assigned to the next CT Machine	1
P	The set of all patients	$\emptyset$
R	The set of all receptionists	$\emptyset$
C	The set of all CT Machines	$\emptyset$

Table 2: List of Data Modules

Name	Source	Inputs	Outputs
PatientInterArrival	Exponential distribution	$\lambda = 8$/h	Interarrival time
PatientPriority	Discrete distribution	Values = [1,2,3,4,5], Probabilites = [0.05, 0.2, 0.15, 0.4, 0.2]	Priority level
NumReceptionists	Constant	-	-
NumCTMachines	Constant	-	-
CheckInTime	Uniform distribution	Min = 2min, Max = 5min	Check in time
ScanTime	Log normal distribution	Log mean = -1.34, Log s.d. = 0.29	Scan time

2 Components

Table 3: List of Entities

Entity	Type	Attributes
Patient	Active	ID Priority CurentStart State StateTimes
Receptionist	Active	ID CurentStart State StateTimes
CT Machine	Active	ID CurentStart NeedMaintenance State StateTimes

Table 4: List of Transitions

No.	Participant(s)	From Event(s)	To Event(s)
1	Patient(p)	Arrive(p)	Wait for check in.Start(p)
2	Patient(p)	Arrive(p)	Wait for scan.Start(p)
3	Patient(p), Receptionist(r)	Wait for check in.End(p) Wait for task (R).End(r)	Check in.Start(p, r)
4	Patient(p), Receptionist(r)	Check in.End(p, r)	Wait for scan.Start(p) Wait for task (R).Start(r)
5	Patient(p), CT Machine(c)	Wait for check in.End(p) Wait for task (CT).End(c)	Scan.Start(p, c)
6	Patient(p) CT Machine(c)	Scan.End(p, c)	Leave(p) Wait for task (CT).Start(c)
7	Receptionist(r)	Arrive(r)	Wait for task (R).Start(r)
8	Receptionist(r)	Wait for task (R).End(r)	Leave(r)
9	CT Machine(c)	Arrive(c)	Wait for task (CT).Start(c)
10	CT Machine(c)	Wait for task (CT).End(c)	Maintenance.Start(c)
11	CT Machine(c)	Maintenance.End(c)	Wait for task (CT).Start(c)
12	CT Machine(c)	Wait for task (CT).End(c)	Leave(c)

Table 5: Activities

Activity	Participants	Event	Type	State Change
Wait for check in	Patient(p)	Start	Scheduled	1: TRIGGER OnStartWaitForCheckIn WITH p
		End	Controlled	
Check in	Patient(p), Reception-ist(r)	Start	Scheduled	1: SCHEDULE Check in.End at TIME + CheckInTime()
		End	Scheduled	1: TRANSITION 4 WITH p, o
Wait for scan	Patient(p)	Start	Scheduled	1: TRIGGER OnStartWaitForScan WITH p
		End	Controlled	
Scan	Patient(p), CT Machine(c)	Start	Controlled	1: SCHEDULE Scan.End at TIME + ScanTime()
		End	Scheduled	1: TRANSITION 6 WITH p, c
Wait for task (R)	Reception-ist(r)	Start	Scheduled	1: TRIGGER OnStartWaitForTaskR WITH r
		End	Controlled	
Wait for task (CT)	CT Machine(c)	Start	Scheduled	1: TRIGGER OnStartWaitForTaskCT WITH c
		End	Controlled	
Mainten-ance	CT Machine(c)	Start	Scheduled	1: SCHEDULE Maintenance.End at TIME + 30 minutes
		End	Scheduled	1: c.NeedMaintenance = 0 2: TRANSITION 11 WITH c

Table 6: Events

Event	Participants	Type	State Change
Arrival (P)	Patient(p)	Scheduled	1: p.ID = NextPatIDNum 2: p.Priority = PatientPriority() 3: NextPatIDNum = NextPatIDNum + 1 4: SCHEDULE Patient Arrival at TIME + PatientInterArrival() 5: **if** p.Priority $\leq$ 2 **then** 6: TRANSITION 2 WITH p 7: **else** 8: TRANSITION 1 WITH p 9: **end if**
Leave (P)	Patient(p)	Scheduled	1: Calculate statistics for p
Arrival (R)	Reception-ist(r)	Scheduled	1: r.ID = NextReceptionistIDNum 2: NextReceptionistIDNum = NextReceptionistIDNum + 1 3: **if** NextReceptionistIDNum $\leq$ NumReceptionists **then** 4: SCHEDULE Arrival (R) at TIME 5: **end if** 6: TRANSITION 7 WITH r
Leave (R)	Reception-ist(r)	Scheduled	1: Calculate statistics for r
Arrival (CT)	CT Machine(c)	Scheduled	1: c.ID = NextCTMachineIDNum 2: NextCTMachineIDNum = NextCTMachineIDNum + 1 3: **if** NextCTMachineIDNum $\leq$ NumCTMachines **then** 4: SCHEDULE Arrival (CT) at TIME 5: **end if** 6: TRIGGER OnCTMachineArrive WITH c 7: TRANSITION 9 WITH c
Require Mainte-nance	CT Machine(c)	Scheduled	1: c.NeedMaintenance = 1 2: TRIGGER OnRequireMaintenance WITH c
Leave (CT)	CT Machine(c)	Scheduled	1: Calculate statistics for c

3 Activity Diagrams

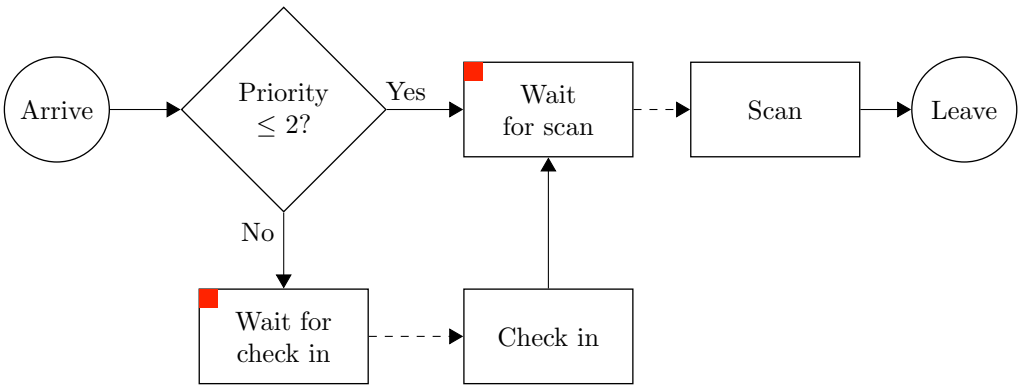

Figure 1: Patient Activity Diagram

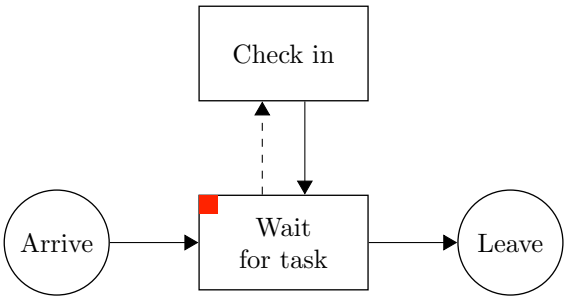

Figure 2: Receptionist Activity Diagram

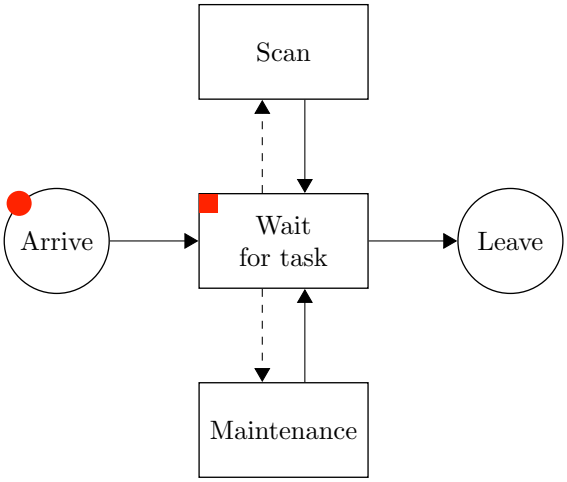

Figure 3: CT Machine Activity Diagram

4 Logic

Table 7: OnStartWaitForCheckIn

Triggered by	Patient p
1: $\mathcal{R} = \{r \in R \mid r.\text{State} = \text{Wait for task (R)}\}$	
2: **if** $\mathcal{R} \neq \emptyset$ **then**	
3: $\hat{r} = \arg\min\{r.\text{Current Start} \mid r \in \mathcal{R}\}$	
4: TRANSITION 3 WITH p and $\hat{r}$	
5: **end if**	

Table 8: OnStartWaitForScan

Triggered by	Patient p
1: $\mathcal{C} = \{c \in C \mid c.\text{State} = \text{Wait for task (C)}\}$	
2: **if** $\mathcal{C} \neq \emptyset$ **then**	
3: $\hat{c} = \arg\min\{c.\text{Current Start} \mid c \in \mathcal{C}\}$	
4: TRANSITION 5 WITH p and $\hat{c}$	
5: **end if**	

Table 9: OnStartWaitForTaskReceptionist

Triggered by	Receptionist r
1: $\mathcal{P} = \{p \in P \mid p.\text{State} = \text{Wait for check in}\}$	
2: **if** $\mathcal{P} \neq \emptyset$ **then**	
3: $\hat{p} = \arg\min\{p.\text{Current Start} \mid p \in \mathcal{P}\}$	
4: TRANSITION 3 WITH r and $\hat{p}$	
5: **end if**	

Table 10: OnStartWaitForTaskCTMachine

Triggered by	CT Machine c
1: $\mathcal{P} = \{p \in P \mid p.\text{State} = \text{Wait for scan}\}$	
2: **if** $c.NeedMaintenance = 1$ **then**	
3: TRANSITION 10 WITH c	
4: **else if** $\mathcal{P} \neq \emptyset$ **then**	
5: $\text{top\_priority} = \max\{p.\text{Priority} \mid p \in \mathcal{P}\}$	
6: $\mathcal{P}_1 = \{p \in \mathcal{P} \mid p.\text{Priority} = \text{top\_priority}\}$	
7: $\hat{p} = \arg\min\{p.\text{Current Start} \mid p \in \mathcal{P}_1\}$	
8: TRANSITION 3 WITH r and $\hat{p}$	
9: **end if**	

Table 11: OnCTMachineArrive

Triggered by	CT Machine c
1: SCHEDULE Require Maintenance with c at TIME+ 8 hours	

Table 12: OnRequireMaintenance

Triggered by	CT Machine c
1: SCHEDULE Require Maintenance with c at TIME+ 8 hours	
2: **if** $c.State = WaitForTask$ **then**	
3: TRANSITON 10 Maintenance with c	
4: **end if**	