

Mokhizar 22L-7896 SE-6B

Quiz # 1: Formal Methods

Section A

20/20



Total Points:

good work

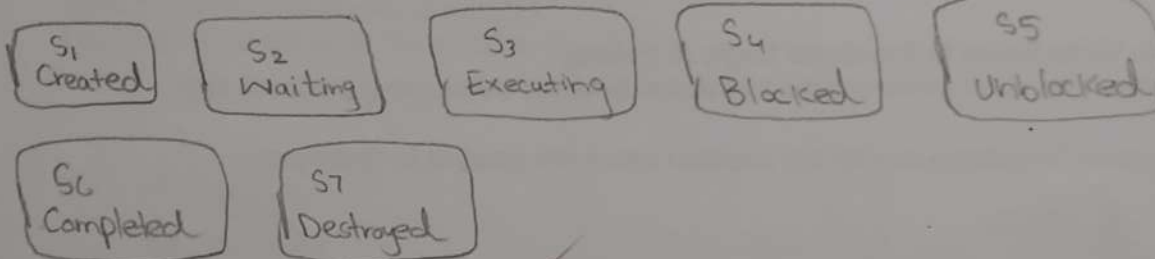
Modeling a Finite State Machine (FSM) for a Single Process in an Operating System

Objective:

Design a Finite State Machine (FSM) for a single process in an operating system. A process is created and then waits to be assigned to the CPU, a ready process may start executing once the processor is assigned to it, a process may get blocked due to an I/O request. As the I/O completes the process is unblocked and gets ready to be assigned CPU again. Once the process completes its execution it is destroyed. A process may get destroyed at any state due to terminate process event.

Task 1: Define the States (5 points)

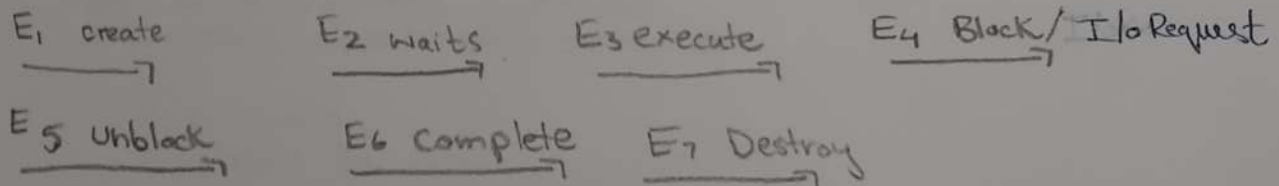
List all possible states of the process, S_1, \dots, S_n



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Task 2: Define the Events E_1, \dots, E_m (5 Points)

List the events that trigger transitions between states.

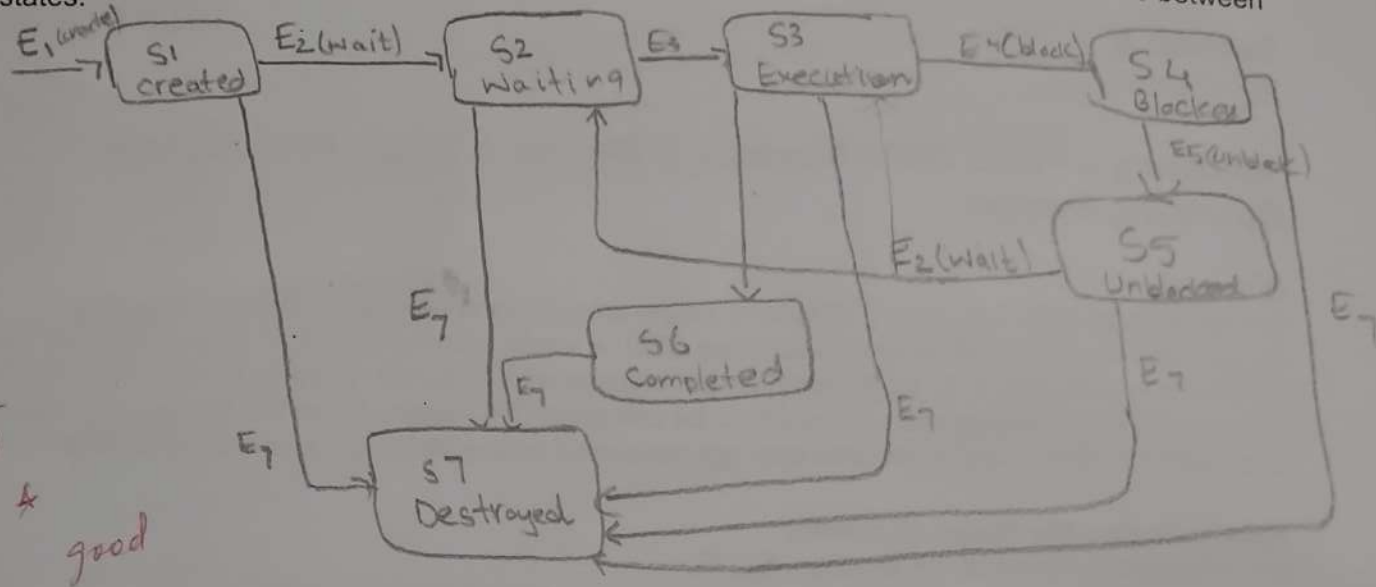


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use pencil for diagrams only

Task 3: Draw the FSM Diagram (5 Points)

Draw the Finite State Machine diagram. Clearly label the states, events, and transitions between states.



Task 4: Write Rules in Predicate Logic (5 Points)

Write down the rules governing the transitions between states using predicate logic.

(Write down transition rules for the scenario where the process is destroyed)

$$S_1 \wedge E_7 \Rightarrow S_7 \text{ (Destroyed)}$$

$$S_2 \wedge E_7 \Rightarrow S_7 //$$

$$S_3 \wedge E_7 \Rightarrow S_7 //$$

$$S_4 \wedge E_7 \Rightarrow S_7 //$$

$$S_5 \wedge E_7 \Rightarrow S_7 //$$

$$S_6 \wedge E_7 \Rightarrow S_7 //$$

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