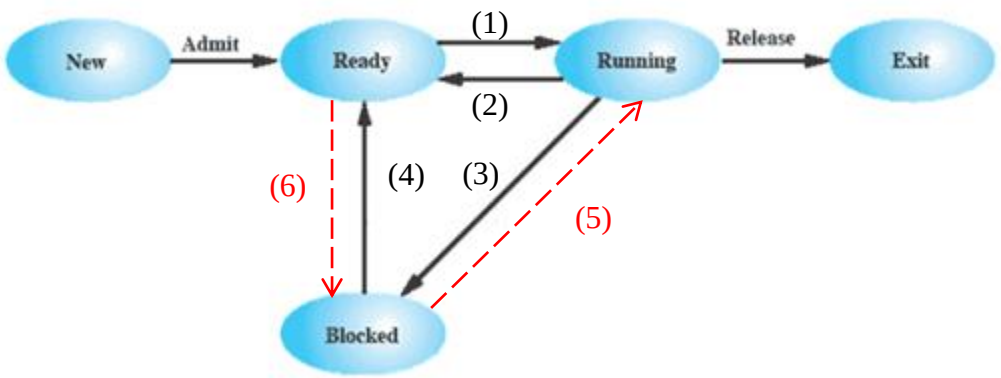
1. Given the five-state process model,

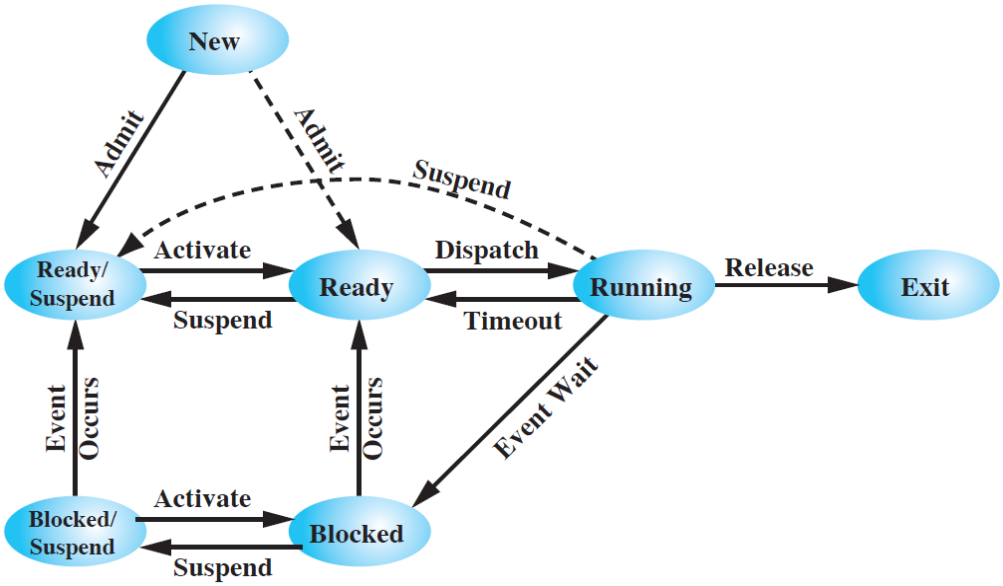
a) Briefly describe each process state.

b) Briefly describe the possible cause for state transitions between ***Ready***, ***Running***, and ***Blocked*** states (the black lines numbered as 1, 2, 3, 4).

c) Notice that there is no transition from ***Blocked*** to ***Running*** and from ***Ready*** to ***Blocked***. In theory, with three states, there could be six transitions, two out of each state. Is it possible that either or both of the missing transitions (the two red dotted lines numbered as 5 and 6) might occur?



2. Consider the following 7-state process model.



a) Why is it necessary to have two blocked states and two ready states?

b) Do you agree with each of the following OS decisions? Please justify.

i) Move a blocked process to the ***Blocked/Suspend*** state.

ii) Move a ready process to the ***Ready/Suspend*** state.

iii) Activate a process in the ***Ready/Suspend*** state to be a ready process even when there are other ready processes available.

3. Including the initial parent process, how many processes are created by the following program?

```
#include <stdio.h>
#include <unistd.h>

int main()
{       int i;
        for (i=0; i<4; i++)
                fork();
        return 0;
}
```

Self-test

Choose the best answer.

1. The portion of the operating system that selects the next process to run is called the _____.

A. trace
B. thread
C. dispatcher
D. process control block

2. In the Two-State Process Model, which of the following gives a reason for the transition ‘pause’ from the “Running” state to the “Not Running” state?

A. The running process has reached the maximum allowable time
B. The running process may voluntarily release control of the processor
C. The running process requests something for which it must wait
D. All of the above

3. A process is in the _____ state when it is in main memory and awaiting an event.

A. Blocked
B. Blocked/Suspend
C. Ready/Suspend
D. Ready

4. When a process is in the _____ state it is in secondary memory but is available for execution as soon as it is loaded into main memory.

A. Blocked
B. Blocked/Suspend
C. Ready
D. Ready/Suspend

5. Which of the following is a possible reason for process suspension?

A. A user requests to suspend execution of a program
B. A parent process requests to suspend its child process
C. The OS suspends a periodic process waiting for the next time interval
D. All of the above

6. The collection of program, data, stack, and attributes is referred to as the _____ .

A. process structure
B. process control block
C. process location
D. process image