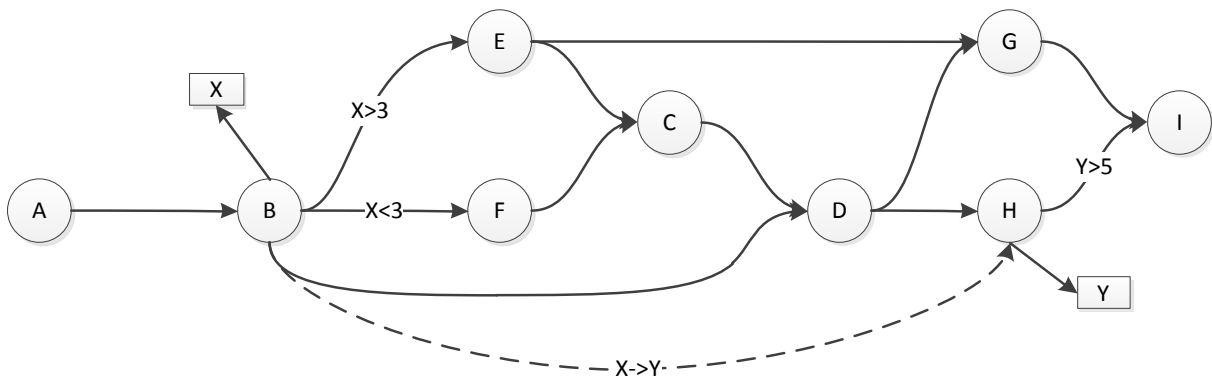


Questions 18-24 of exam 4 April 2016

Question 18

Consider the Activity net in the figure below. Assume all activities have an AT_LEAST_ONE join semantic. Activities can be in one of five states: *Not activated*, *Activated*, *Running*, *Completed*, or *Skipped*. Which of these activities are always executed (choose the most complete answer)?

- (a) A and B.
- (b) A, B, and I.
- (c) A, B, D, H, and I.
- (d) A, B, D, G, H, and I.



Answer: Assuming that the label with the data connector indicates a mapping between data field X and data field Y ($X \rightarrow Y$), the right answer is A, B, D, G, H, I (because B, D, G, H and I will have at least one incoming control connector that signals TRUE, and because H will get the value of X assigned to Y in its input container). This is option (d).

Question 19

Consider the Activity net of the previous question. The execution of the Activity net is started, and execution events are recorded in a log. At some point in time the execution is stopped. This is the execution log until that point:

start(A)	end(A)	start(B)	end(B) [X=3]
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Which activity/activities is/are Activated?

- (a) D
- (b) A and B
- (c) A, B, and D
- (d) D and H

Answer: Option (a) – only D will be in the Activated state, since it is the only activity that has at this point in time an incoming control connector that is signaled TRUE.

Question 20

For the same Activity net and execution log, which activity/activities is/are Completed?

- (a) A
- (b) B

- (c) A and B
- (d) A, B, and D

Answer: Option (c).

Question 21

For the same Activity net and execution log, which activity/activities is/are Running?

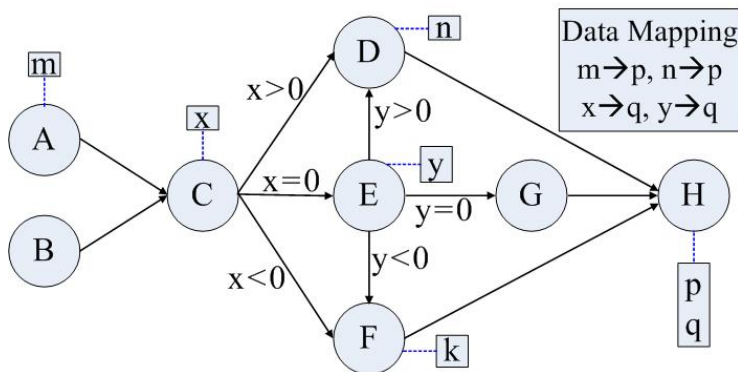
- (a) A
- (b) D, G and H
- (c) C, E and F
- (d) None of the above

Answer: Option (d) – according to the execution log, A and B have completed, but no other activity has started yet.

Question 22

Consider the following Activity Net S and assume that all activities have join semantics AT_LEAST_ONE. Note that m, n, x, and y are output data items while k, p, and q are input data items. Activities can be in one of five states: *Not activated*, *Activated*, *Running*, *Completed*, or *Skipped*. Which activities will always get executed for completed workflow instances on S, independent of the concrete execution path taken (pick the most accurate answer)?

- (a) A, B, and C
- (b) A and H
- (c) A, B, C and G
- (d) A, B, C and H



Answer: option (d) – it is clear that A, B, C will always get executed (A and B are activated at the beginning of each instance, and have no conditions to prevent execution), and it is also clear that D, E and F will not always get executed. But what about H? Note that H requires input for data fields p and q. Input for p can either come from m (in output container of A) or n (in output container of D), and input for q can either come from x (in output container of C) or y (in output container of E). Then, since A and C will always complete, and therefore values for m and x will always be produced, p and q will always get a value, and therefore H can always be executed.

Question 23

Regarding the previous activity net, observe the following execution log:

START(A)	END(A) [m = 3]	...	START(H)	END(H) [p = 5]
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Which statement(s) is/are true?

- (a) A has the state completed
- (b) F has been skipped
- (c) G has been completed
- (d) H has the state activated

Answer: options (a) and (b) are true. End(A) signifies that A has been completed. End(H) signifies that H has been completed. Since $p = 5$ according to the execution log, this value must have been assigned via n (because $m = 3$ after completion of A), hence D must have been executed to completion. Execution of D is only possible if $x > 0$, hence E and F have not been executed, which implies that F has been skipped.

Question 24

Regarding the previous activity net, observe the following execution log:

...	END(E) [y = -20]
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Which statement(s) is/are true?

- (a) A has been completed
- (b) B has been skipped
- (c) F has been skipped
- (d) G has been completed

Answer: Only option (a) is true. From the execution log we can conclude that E has been executed to completion with $y = -20$, and therefore F is enabled (activated) and G is skipped. The execution of E implies that C has completed execution (with $c = 0$), and therefore either A or B has completed execution. B cannot be skipped (it is always activated when an instance starts, and has no condition to prevent getting executed), hence the only answer that can be true is option (a).