Assignment 7

Considering the following log.

Case ID	Activity
1	A
2	A
3	A
1	B
1	C
2	D
2	E
2	F
3	D
1	H
3	F
2	G
3	E
2	H
3	G
3	H

Apply Alpha-algorithm (process mining). Show all steps, and draw the resulted Petri Net model.

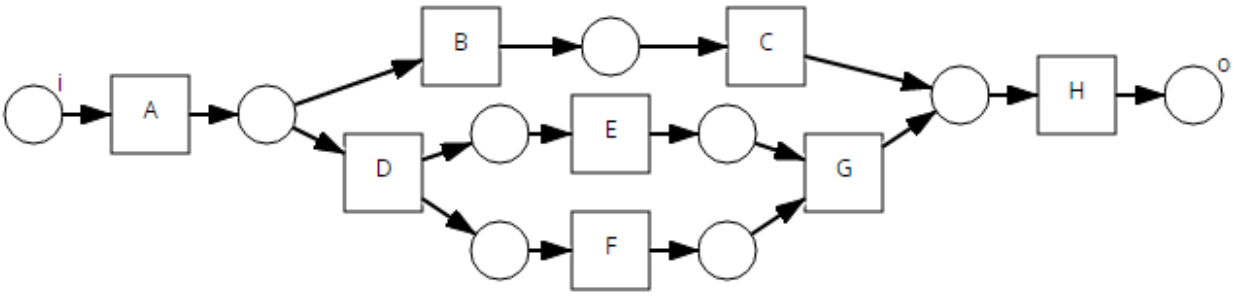
Solution:

Direct follower	Causality	Parallel	Exclusiveness	
A>B	A→B	E||F	A#C	C#D
A>D	A→D		A#E	C#E
B>C	B→C		A#G	C#F
C>H	C→H		A#H	C#G
D>E	D→E		B#D	D#G
D>F	D→F		B#E	D#H
E>F	E→G		B#F	E#H
E>G	F→G		B#G	F#H
F>E	G→H		B#H	
F>G				
G>H				

	A	B	C	D	E	F	G	H
A	#	→	#	→	#	#	#	#
B	←	#	→	#	#	#	#	#
C	#	←	#	#	#	#	#	→
D	←	#	←	#	→	→	#	#
E	#	#	#	←	#	||	→	#
F	#	#	#	←	||	#	→	#
G	#	#	#	#	←	←	#	→
H	#	#	←	#	#	#	←	#

Solution steps:

1. **W = {ABCH, ADEFGH, ADFEGH}**
2. T_w={A,B,C,D,E,F,G,H}
3. T_I = {A}
4. T_o= {H}
5. X_w = {({A},{B}),({A},{D}),({A},{B,D}),({B},{C}),({C},{H}),({D},{E}),({D},{F}), ({E},{G}), ({F},{G}), ({G},{H}), ({C,G},{H})}
6. Y_w = {({A},{B,D}),({B},{C}), ({D},{E}),({D},{F}), ({E},{G}), ({F},{G}), ({C,G},{H})}
7. P_w ={$P_{(\{A\},\{B,D\})}$, $P_{(\{B\},\{C\})}$, $P_{(\{D\},\{E\})}$,$P_{(\{D\},\{F\})}$, $P_{(\{E\},\{G\})}$, $P_{(\{F\},\{G\})}$, $P_{(\{C,G\},\{H\})}$, i_w , o_w }
8. F_w={(i_w , A), (A, $P_{(\{A\},\{B,D\})}$) , ($P_{(\{A\},\{B,D\})}$,B),($P_{(\{A\},\{B,D\})}$,D), (B, $P_{(\{B\},\{C\})}$), ($P_{(\{B\},\{C\})}$,C),(C, $P_{(\{C\},\{H\})}$) ,(D, $P_{(\{D\},\{E\})}$),($P_{(\{D\},\{E\})}$,E), (D, $P_{(\{D\},\{F\})}$),($P_{(\{D\},\{F\})}$,F), (E, $P_{(\{E\},\{G\})}$), ($P_{(\{E\},\{G\})}$,G) , (F, $P_{(\{F\},\{G\})}$), ($P_{(\{F\},\{G\})}$,G), (G, $P_{(G\},\{H\})}$), ($P_{(\{G\},\{H\})}$,H), (H , o_w)}
9. α(W) = (P_W,T_W,F_W).



Grading:

Total 12 grades:

- 8 grades for steps from 1 to 8
- 2 grades for Either relations matrix OR (causality, parallelism) tables
- 2 grades for Petri Net graph. (correct splitter, correct joiner, start event, end event)