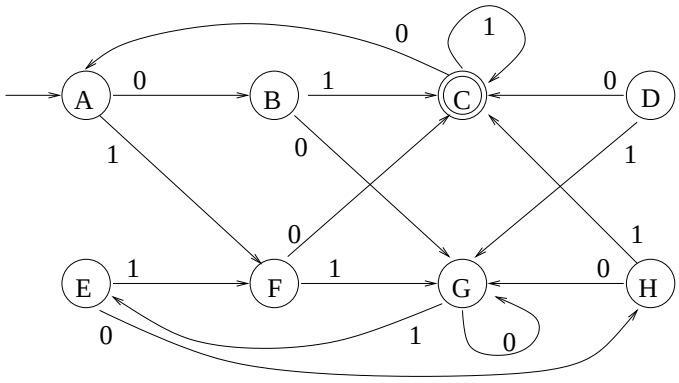
1 Minimization of Finite Automata: Example

Example: We apply our algorithm to the automaton given below:



Step 1: We have one unreachable state, state D. We remove this state and proceed to Step 2.

Step 2: We first mark pairs of final and non-final states, getting the following tableau:

B						
C	X	X				
E			X			
F			X			
G			X			
H			X			
	A	B	C	E	F	G

In the first iteration we examine all unmarked pairs. For example, for pair A, B, we get $\delta(A, 1) = F$ and $\delta(B, 1) = C$, and the pair C, F is marked, so we mark A, B too. After doing it for all pairs, we get the following tableau.

B	X					
C	X	X				
E		X	X			
F	X	X	X	X		
G		X	X		X	
H	X		X	X	X	X
	A	B	C	E	F	G

In the next iteration, we examine the remaining pairs. For example, we will mark pair A, G because $\delta(A, 0) = B$ and $\delta(G, 0) = G$, and the pair B, G is marked. When we're done we get the following tableau:

B	X					
C	X	X				
E		X	X			
F	X	X	X	X		
G	X	X	X	X	X	
H	X		X	X	X	X
	A	B	C	E	F	G

One more iteration will be executed now, but no new distinguishable pairs will be discovered. So we are done with Step 2 now.

Step 3: We group the states into the equivalence classes. Since A, E are equivalent and B, H are equivalent, the classes are: $\{A, E\}$, $\{B, H\}$, $\{C\}$, $\{F\}$, $\{G\}$. The minimal automaton $\hat{A}$ is: