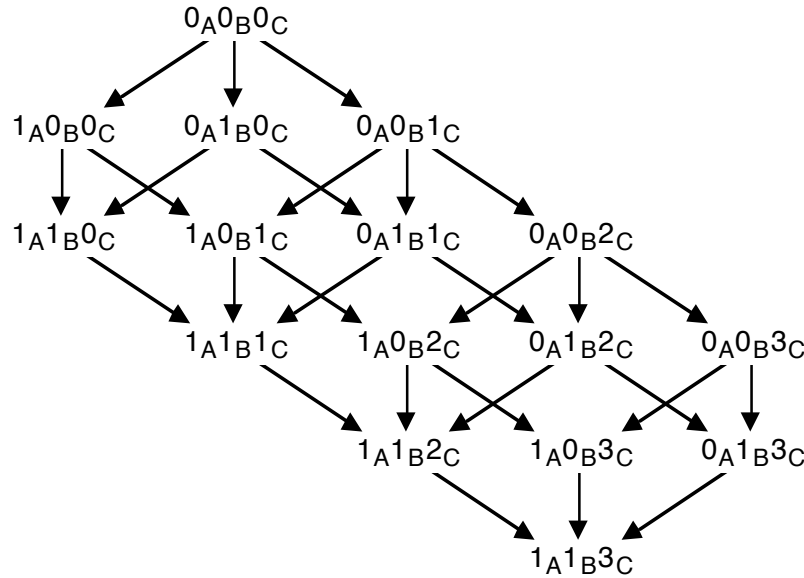


1. (a) Draw the precedence diagram of feasible states that are enumerated by the multi-class MVA algorithm when the system being analyzed has three job classes A, B, and C with 1, 1, and 3 jobs, respectively.



- (b) A system consists of a cpu, a disk, and two terminals. Jobs come in two classes. Class A jobs are interactive. There is one class A job associated with each terminal. Class B jobs are batch jobs. At any given time, there is only one class B job in the system. The demands of the two classes of jobs are:

$$\begin{aligned}
 D_{A,cpu} &= 1 & D_{B,cpu} &= 3 \\
 D_{A,disk} &= 5 & D_{B,disk} &= 3 \\
 D_{A,terminals} &= 10
 \end{aligned}$$

What is the average number of jobs at the terminals?

	$0_A 0_B$	$1_A 0_B$	$0_A 1_B$	$1_A 1_B$	$2_A 0_B$	$2_A 1_B$
$R_{A,cpu}$	-	1	-	1.5	1.0625	1.5263
$R_{A,disk}$	-	5	-	7.5	6.5625	9.7368
$R_{B,cpu}$	-	-	3	3.1875	-	3.3617
$R_{B,disk}$	-	-	3	3.9375	-	5.2340
$X_A$	-	0.0625	-	0.0526	0.1135	0.0941
$X_B$	-	-	0.1667	0.1404	-	0.1163
$Q_{A,cpu}$	0	0.0625	-	0.0789	0.1206	0.1436
$Q_{A,disk}$	0	0.3125	-	0.3947	0.7447	0.9158
$Q_{B,cpu}$	0	-	0.5	0.4474	-	0.3911
$Q_{B,disk}$	0	-	0.5	0.5526	-	0.6089

The average number of jobs at the terminals is  $2 - Q_{A,cpu} - Q_{A,disk} = 0.9406$ .