1.

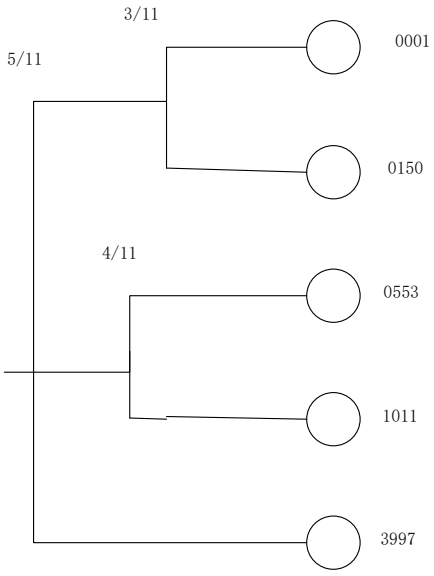
MID	Rom	Dra	Mys	Ani	Act	Fic	Sci	Thr	Hor	Cri	Fan
0001	1	1	1	1	0	0	0	0	0	0	0
0150	1	1	0	0	0	1	0	0	0	0	0
0553	0	0	1	0	1	0	1	1	0	0	0
1011	0	0	0	0	0	0	0	1	1	0	0
3997	0	0	0	0	1	0	1	0	1	1	1

D(0001,0150)=3/11
D(0001,0553)=6/11
D(0001,1011)=6/11
D(0001,3997)=9/11
D(0150,0553)=7/11
D(0150,1011)=5/11
D(0150,3997)=8/11
D(0553,1011)=4/11
D(0553,3997)=5/11
D(1011,3997)=5/11

(a)

$$\begin{array}{c} \\ 0001 \\ 0150 \\ 0553 \\ 1011 \\ 3997 \end{array} \begin{array}{c} \begin{array}{ccccc} 0001 & 0150 & 0553 & 1011 & 3997 \end{array} \\ \begin{bmatrix} 0 & & & & \\ 3/11 & 0 & & & \\ 6/11 & 7/11 & 0 & & \\ 6/11 & 5/11 & 4/11 & 0 & \\ 9/11 & 8/11 & 5/11 & 5/11 & 0 \end{bmatrix} \end{array}$$

(b) P1=[0001],[0150],[0553],[1011],[3997]
P2=[0001,0150],[0553],[1011],[3997]
P3=[0001,0150],[0553,1011],[3997]
P4=[0001,0150,0553,1011,3997]



(c)

MID	Rom	Dra	Mys	Ani	Fic	Sci	Thr	Hor	Cri	Fan
0001	1	1	1	1	0	0	0	0	0	0
0150	1	1	0	0	1	0	0	0	0	0
0553	0	0	1	0	0	1	1	0	0	0
1011	0	0	0	0	0	0	1	1	0	0
3997	0	0	0	0	0	1	0	1	1	1
4000	0	0	1	1	0	0	0	0	0	1

D(0001,4000)=0.3
D(0150,4000)=0.6
D(0553,4000)=0.4
D(1011,4000)=0.5
D(3997,4000)=0.5
So, it should be assigned to cluster {0001, 4000} or {0001, 0150, 4000}

2.
(a)
P (NTD=Down) = 2/7
P (NTD=Level) = 2/7
P (NTD=Up) = 3/7

2TDB		
P(2TDB=Up| NTD=Down)=1/2	P(2TDB=Up| NTD=Level)=1	P (2TDB=Up| NTD=Up) = 1/3
P(2TDB=Level| NTD=Down)= 1/2	P(2TDB=Level| NTD=Level)= 0	P(2TDB=Level| NTD=Up) = 1/3
P(2TDB=Down| NTD=Down) = 0	P(2TDB=Down| NTD=Level)= 0	P(2TDB=Down| NTD=Up)= 1/3

1TDB		
P(1TDB=Up| NTD=Down)=1	P(1TDB=Up| NTD=Level)=1/2	P (1TDB=Up| NTD=Up) = 0
P(1TDB=Level| NTD=Down)= 0	P(1TDB=Level| NTD=Level)=1/2	P(1TDB=Level| NTD=Up) = 1/3
P(1TDB=Down| NTD=Down) = 0	P(1TDB=Down| NTD=Level)= 0	P(1TDB=Down| NTD=Up)= 2/3

TD		
P(TD=Up| NTD=Down)=1/2	P(TD=Up| NTD=Level)=0	P (TD=Up| NTD=Up) = 1/3
P(TD=Level| NTD=Down)= 1/2	P(TD=Level| NTD=Level)= 0	P(TD=Level| NTD=Up) = 2/3
P(TD=Down| NTD=Down) = 0	P(TD=Down| NTD=Level)= 1	P(TD=Down| NTD=Up)= 0

X1=<2TDB=Up,1TDB=Up,TD=Down>
X2=<2TDB=Up,1TDB=Down,TD=Level>

P(X1|NTD=Up)*P(NTD=Up)=0
P(X1|NTD=Level)*P(NTD=Level)=1/7
P(X1|NTD=Down)*P(NTD=Down)=0
P(X2|NTD=Up) *P(NTD=Up)=4/63
P(X2|NTD=Level) *P(NTD=Level)=0
P(X2|NTD=Down) *P(NTD=Down)=0

So, 28 Oct.' NTD is classified as Level, 29 Oct.' NTD is classified as Up

(b)

Today is	2 Trading Day before	1 Trading Day before	Today	Next Trading Day
2 Nov. 2015	*Level*	*Up*		Down
3 Nov. 2015	*Up*		*Down*	Level

Hence, P(2TDB=Level| NTD=Level)= 0, P (1TDB=Up| NTD=Up) = 0
So, NTD=Down

Hence, P(TD=Down| NTD=Down) = 0, P(TD=Down| NTD=Up)= 0
So, NTD=Level
/**
P(2TDB=Down| NTD=Down) = 0
P(2TDB=Level| NTD=Level)= 0
P(2TDB=Down| NTD=Level)= 0
P(1TDB=Level| NTD=Down)= 0
P(1TDB=Down| NTD=Down) = 0
P(1TDB=Down| NTD=Level)= 0
P (1TDB=Up| NTD=Up) = 0
P(TD=Down| NTD=Down) = 0
P(TD=Up| NTD=Level)=0
P(TD=Level| NTD=Level)= 0
P(TD=Down| NTD=Up)= 0
*/