1.

Student ID	101	330	482	503	bioinformatics
x1	1	1	1	1	0
x2	0	1	0	1	1
x3	1	1	1	1	0
x4	1	1	1	0	1
x5	0	1	1	1	1
x6	0	1	1	1	0
x7	0	1	0	0	1
x8	1	0	0	1	1
x9	1	1	1	0	0
xA	0	1	0	1	0
	5	9	6	7	5

b : bioinformatics
1 : 101
3 : 330
4 : 482
5 : 503

∅

Level 1: F 1, F 3, F 4, F 5, F b

Level 2: F 13, F 14, F 15, I 1b, F 34, F 35, F 3b, F 45, I 4b, F 5b

Level 3: 134 F, 135 I, 13b N, 145 I, 14b N, 15b N, 345 F, 34b N, 35b I, 45b N

Level 4: 1345 N, 134b N, 135b N, 145b N, 345b N

Level 5: 1345b N
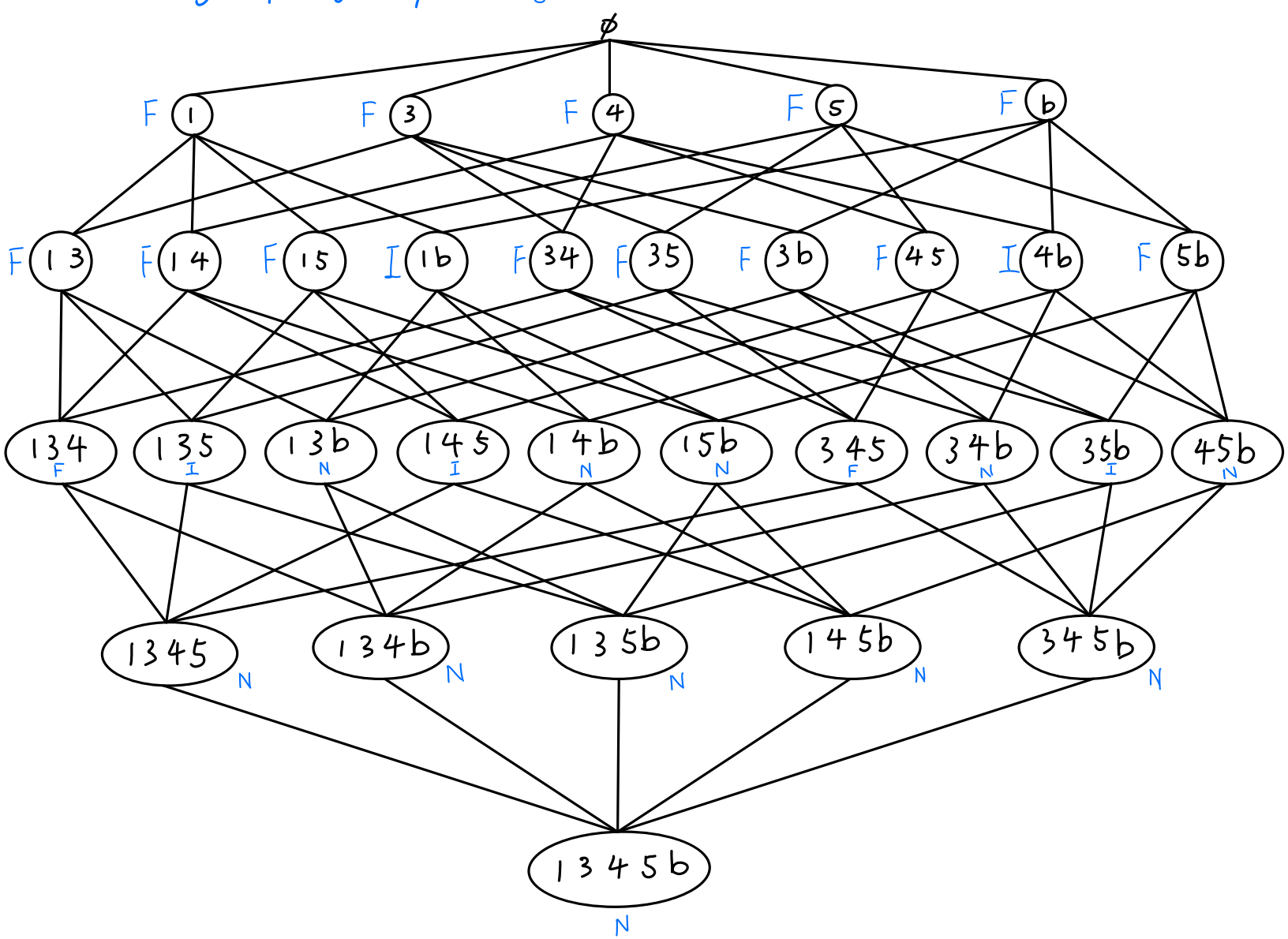
2. $\dfrac{5+8+2}{5+10+10+5+1} = \dfrac{15}{31} \approx 0.48 = 48\%$
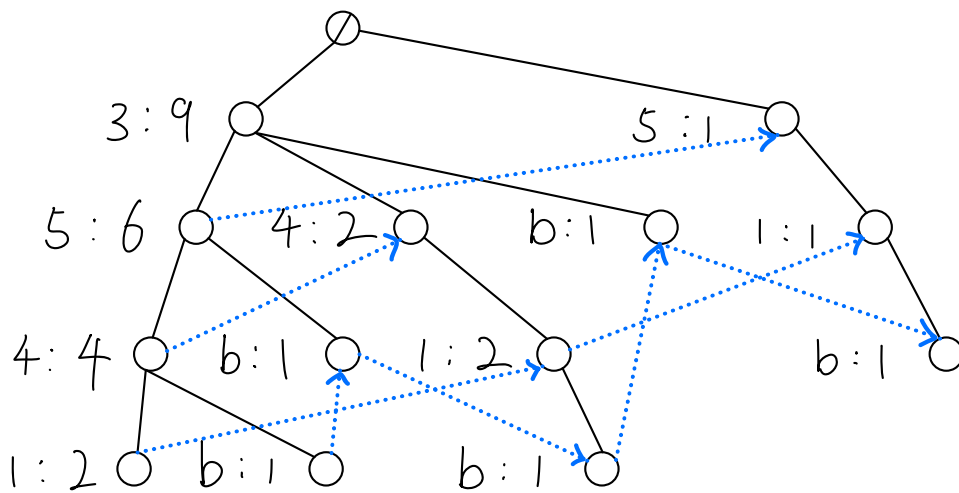
Hence, the percentage of frequent itemsets is 48%.

3. The pruning ratio of the Apriori algorithm on this data set is
$\frac{11}{31} \approx 0.35 = 35\%$.

4. The false alarm rate is $\frac{5}{31} \approx 0.16$.

5. Rank all items: 330, 503, 482, 101, bioinformatics
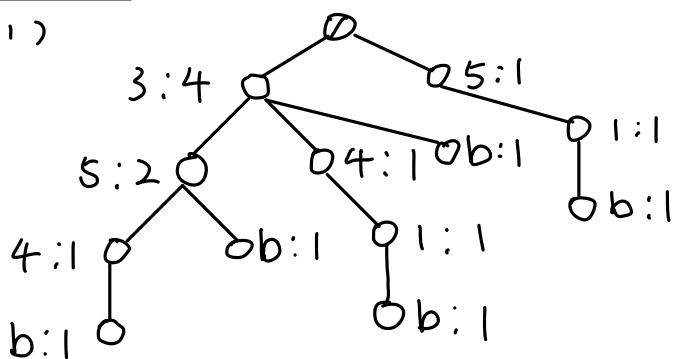   9   7   6   5   5

FP-Tree:

3:9   5:1

5:6   4:2   b:1   1:1

4:4   b:1   1:2   b:1

1:2   b:1   b:1

Legend box:
b : bioinformatics
1 : 101
3 : 330
4 : 482
5 : 503

mine:

(1)
3:4   5:1
5:2   4:1 b:1   1:1
4:1   b:1   1:1   b:1
b:1   b:1

Path containing node b

(2)
3:4   5:1
5:2   4:2   1:1
4:2   1:2
1:2
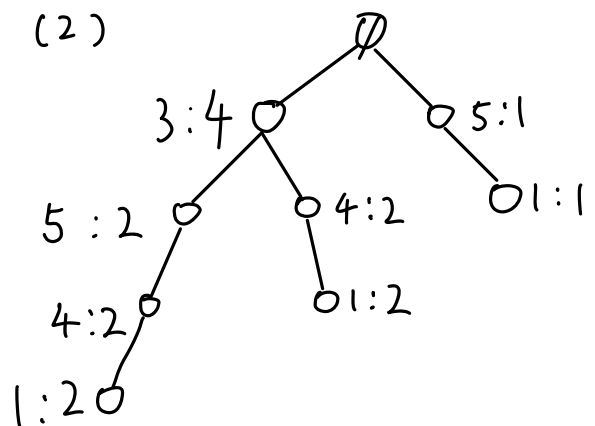
Path containing node 1

(3)
3:6
5:4   4:2
4:4
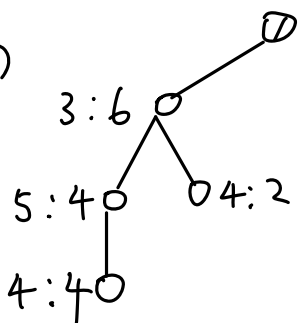
Path containing node 4

(4)
3:6   5:1
5:6
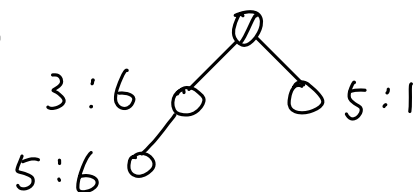
Path containing node 5

(5)
3:9
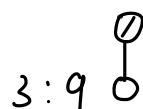
Path containing node 3

minsup = 30%

Suffix	Frequent Itemsets
b	{b}, {5b}, {3b}
1	{1}, {14}, {15}, {13}, {143}
4	{4}, {45}, {34}, {345}
5	{5}, {35}
3	{3}