

Information you may find useful

Powers of two

2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
512	256	128	64	32	16	8	4	2	1

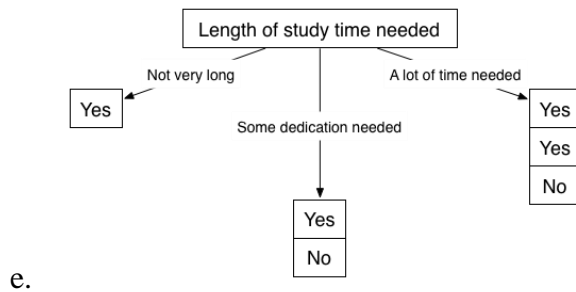
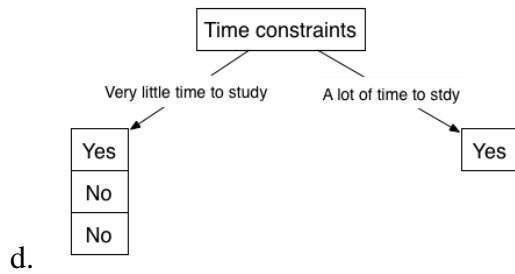
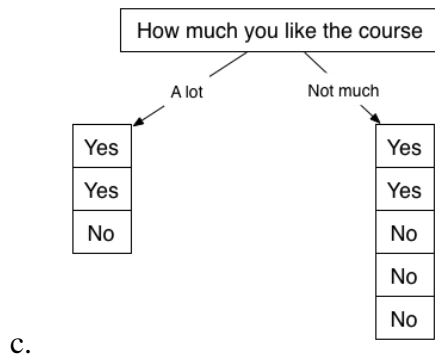
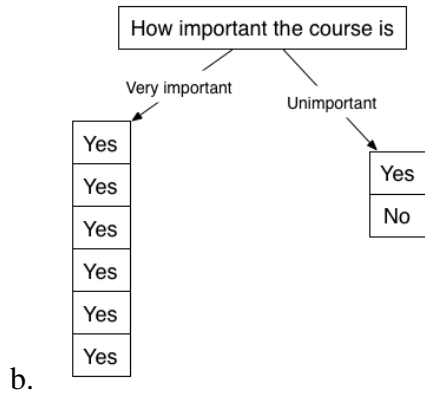
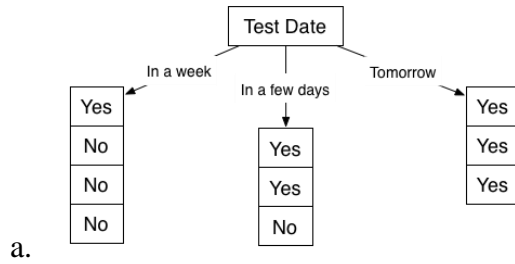
Hexadecimal digits

Binary representation	Decimal representation	Hexadecimal representation
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	10	A
1011	11	B
1100	12	C
1101	13	D
1110	14	E
1111	15	F

Problem 1: Multiple Choice – circle the correct answer [6 marks]

- i. Which of the following is true about vector images?
- a. Vector images are usually significantly bigger in size than raster images, even in compressed forms.
 - b. It is harder for a computer to convert a bitmap image to a vector image than it is to convert a vector image to a bitmap image.
 - c. Shading effects, shadows and colors cannot be added in vector images.
 - d. Vector images support special effects filters that posterize and blur an image.
- ii. Given the transactions below, what is the support of Keyboard and Mouse and the confidence of Keyboard \rightarrow Mouse?
- T1: Desktop, Mouse, Keyboard, Monitor
T2: Laptop, Keyboard, Mouse
T3: Keyboard, Mouse, Monitor
T4: Desktop, Mouse
T5: Laptop, Keyboard
T6: Laptop, Monitor
T7: Desktop, Laptop, Mouse
- a. Support = $3/7$; Confidence = $3/4$
 - b. Support = $3/7$; Confidence = $2/5$
 - c. Support = $3/7$; Confidence = $3/5$
 - d. Support = $3/4$; Confidence = $3/7$
 - e. Support = $3/5$; Confidence = $3/7$

- iii. Using the very simplistic entropy measure that we discussed in class, which of these decision trees about studying for a test has the least entropy?



- iv. Computer animation for movies like Frozen
 - a. Is done using a vector based representation
 - b. Is coded using JavaScript
 - c. Requires a lot of code to understand how light works
 - d. Requires so much work to make backgrounds that the backgrounds can't change much
- v. Computer scientists think that online elections are a good idea
 - a. True
 - b. False
- vi. The percentage of women earning bachelor degrees in computer science in the US and Canada since 1970 has generally
 - a. Steadily increased
 - b. Steadily decreased
 - c. First gone down, then gone up
 - d. First gone up, then gone down

Problem 2: Apriori Algorithm [3 marks]

Given the following dataset:

T1	A	B	C	D
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T2	A	B	E	F
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
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60	0	0	0	0
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64	0	0	0	0
65	0	0	0	0
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67	0	0	0	0
68	0	0	0	0
69	0	0	0	0
70	0	0	0	0
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78	0	0	0	0
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80	0	0	0	0
81	0	0	0	0
82	0	0	0	0
83	0	0	0	0
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85	0	0	0	0
86	0	0	0	0
87	0	0	0	0
88	0	0	0	0
89	0	0	0	0
90	0	0	0	0
91	0	0	0	0
92	0	0	0	0
93	0	0	0	0
94	0	0	0	0
95				

T3 B C E F

T4 C D E F

And a minimum support threshold of 3

- Is $\{E, F\}$ a frequent itemset?
- Is $\{A, B\}$ a frequent itemset?
- Explain why we do not need to consider the itemset $\{A, B, C\}$ when we are constructing frequent itemsets of size 3 with the a priori algorithm.

Problem 3: Number conversion [4 marks]

a. [2 marks] Translate the following binary number to hexadecimal 1010101010100101110111101

b. [2 marks] Translate the following decimal number to binary: 336

Problem 4: Artificial Intelligence [3 marks]

- a. [1 marks] Give a brief definition of what is required of a computer for it to pass the Turing Test:
- b. [2 marks] Could Eliza, the computer therapy program from lab, pass the Turing Test? Why or why not?

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You may use it for scratch paper, but it will NOT be marked