

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

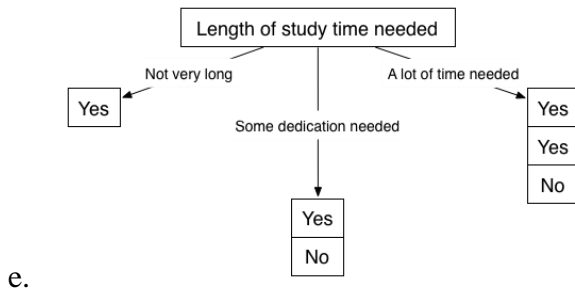
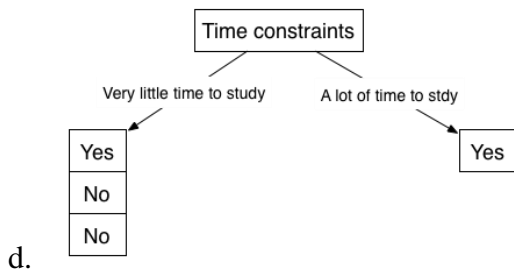
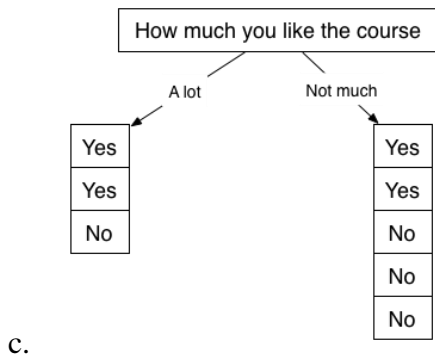
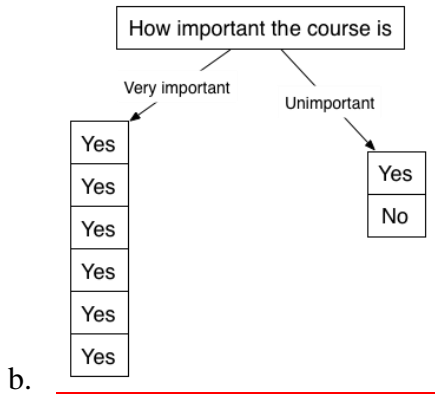
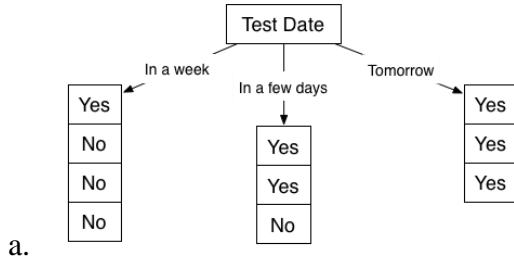
Hexadecimal digits

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? **Peerwise question #2371054**
- 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? **Lightly modified from Peerwise question #2362815**
- 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? Modified from [Peerwise question: 2362286](#)



- 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
T2 A B E F
T3 B C E F
T4 C D E F

And a minimum support threshold of 3

a. Is {E, F} a frequent itemset?

Yes

b. Is {A, B} a frequent itemset?

No

c. 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.

For {A, B, C} to occur frequently, we need {A, B} to occur frequently. Therefore, because {A, B} is not a frequent itemset, {A, B, C} can not be a frequent itemset.

Problem 3: Number conversion [4 marks]

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

Correct answer: 1554BBD

In order to do this problem correctly, you must start from the right and chunk into four digit groups.

1 0101 0101 0100 1011 1011 1101
1 5 5 4 B B D

A common mistake is to start from the left hand side without checking to make sure that there are a multiple of four digits like so:

1010 1010 1010 0101 1101 1110 1

In this case, we would expect the answer to start with:

A A A 5 D E ???

This is wrong. You have to divide numbers up starting at the one's place, not just wherever the top digit happens to end.

One point deducted for this mistake or other minor errors.

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

Correct answer: 101010000

# to convert	336	80	80	16	16	0	0	0	0
place value	256 (2 ⁸)	128 (2 ⁷)	64 (2 ⁶)	32 (2 ⁵)	16 (2 ⁴)	8 (2 ³)	4 (2 ²)	2 (2 ¹)	1 (2 ⁰)
# left over	80	80	16	16	0	0	0	0	0
binary #	1	0	0	0	1	0	0	0	0

Problem 5: 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:

To pass the Turing Test, a computer needs to be able to convince a “judge” via text that is a human. It does not have to be able to speak.

- b. [2 marks] Could Eliza, the computer therapy program from lab, pass the Turing Test? Why or why not?

No. Eliza could not pass the Turing Test because it could not convince people that it was a human.

Grading: one point for yes or no, one point for reason.