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 → 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

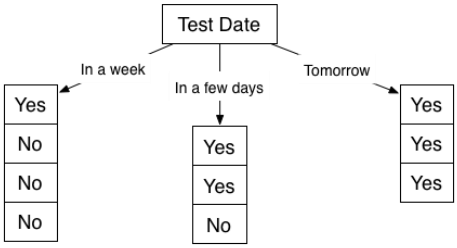
c. Support = 3/7; Confidence = 3/5

d. Support = 3/4; Confidence = 3/7

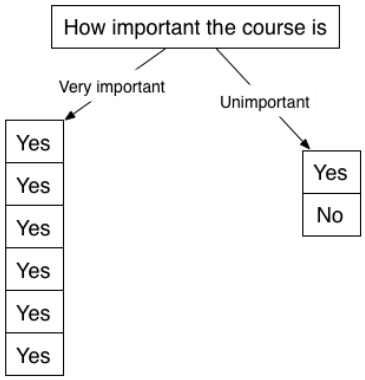
e. Support = 3/5; Confidence = 3/7

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?

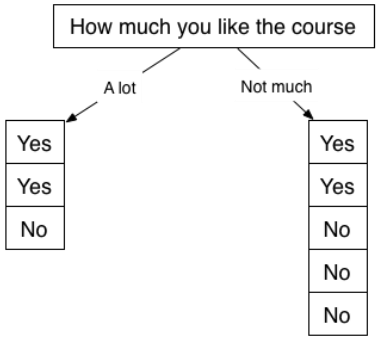
a.



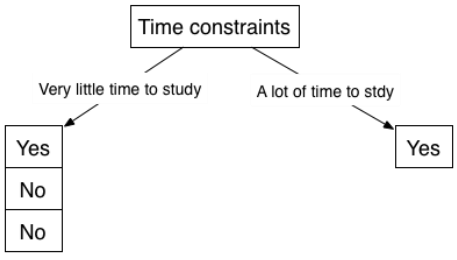
b.



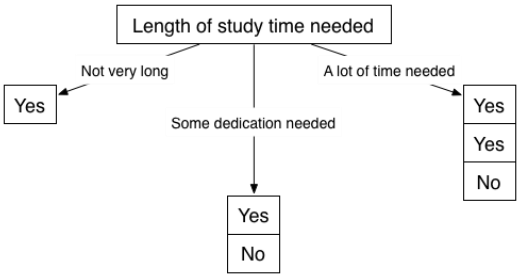
c.



d.



e.



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?

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

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.

Problem 3: Number conversion [4 marks]

a. [2 marks] Translate the following binary number to hexadecimal 101010101010010111011110 1

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