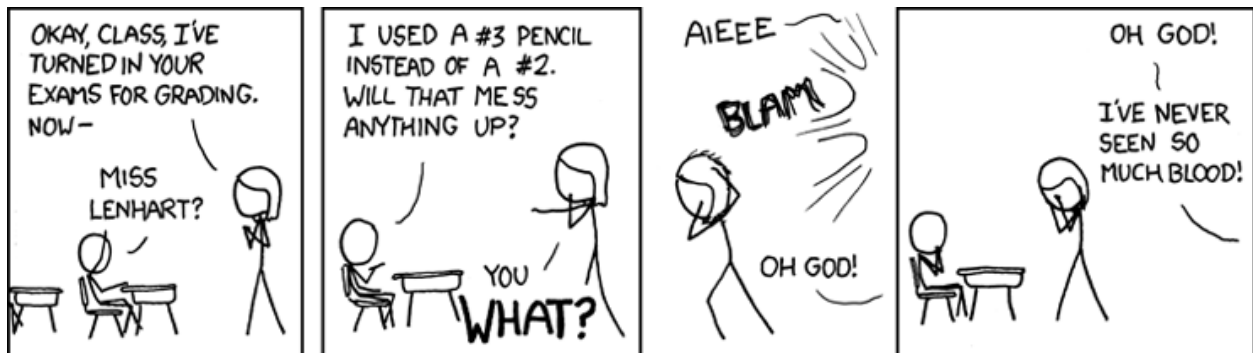


Introduction to Information Technology Midterm



Read carefully before starting the test:

- Answer the questions using pencil or a blue or black pen.
- You can use a calculator if you want, but it can't have internet access.
- Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page
- You are allowed one sheet 11.5 x 8in paper (or smaller) of handwritten notes

FULL NAME: _____

COMPUTING ID: _____

Page:	2	3	4	5	6	7	8	Total
Points:	14	6	6	10	5	9	5	55
Score:								

1 True or False (10 Points)

1. (1 point) T / F : A digital signal has a limited precision.
2. (1 point) T / F : Solid State Drives use a spinning disk to read and write information.
3. (1 point) T / F : Boolean logic is the basis of computer circuit design.
4. (1 point) T / F : LAN networks typically use WiFi to wireless transport information.
5. (1 point) T / F : Programming Languages can tell computers to do things binary programs can't.
6. (1 point) T / F : Network packets can be sent independently of each other in parallel.
7. (1 point) T / F : Software as a Service (SaaS) is the most general form of cloud computing
8. (1 point) T / F : CSS can change the way HTML is displayed on a browser.
9. (1 point) T / F : Stochastic Gradient Descent is a method to train machine learning models.
10. (1 point) T / F : An overfit machine learning model will perform poorly on the training set.

2 Multiple Choice (10 Points)

11. (1 point) Which of the following does not have the primary task of performing computation?
 - A. The GPU
 - B. The Motherboard
 - C. The CPU
 - D. All of the above
12. (1 point) Which of the following is a constant in boolean logic:
 - A. \oplus
 - B. X
 - C. And
 - D. True
13. (1 point) The Internet Protocol Suite layer which defines where information is sent is:
 - A. The Internet Layer
 - B. The Link Layer
 - C. The Application Layer
 - D. The Transport Layer
14. (1 point) Which core language of the internet is mainly responsible for dynamic (responsive) content:
 - A. HTML
 - B. Javascript
 - C. CSS
 - D. Emerald

-
15. (1 point) Which component of the Model-View-Controller pattern is responsible for maintaining a database:
- A. The View
 - B. The Model
 - C. The Controller
 - D. All of the above
16. (1 point) Which is not a class of learning in machine learning:
- A. Supervised Learning
 - B. Reinforcement Learning
 - C. Chaos Learning
 - D. Unsupervised Learning
17. (1 point) Which of the following is a component of a computer's CPU (Central Processing Unit)?
- A. Hard Drive
 - B. RAM (Random Access Memory)
 - C. Graphics Card
 - D. ALU (Arithmetic Logic Unit)
18. (1 point) Spreadsheet formulas can include:
- A. Cell references
 - B. Hard coded Values
 - C. Functions
 - D. All of the Above
19. (1 point) Database Management Systems include
- A. A physical device to store data
 - B. A way to store, access, and update data
 - C. Developers that maintain the database
 - D. A general purpose programming language
20. (1 point) In a database, the field responsible for uniquely identifying a data point is the
- A. Primary Key
 - B. Primary Field
 - C. Unique Key
 - D. Unique Field
21. (1 point (bonus)) What town is Will from? (I told you it would be on the test)
- A. Oak Forest, IL
 - B. Peoria, IL
 - C. Tinley Park, IL
 - D. Lincoln, NE

3 Show Your Work (21 Points)

22. (3 points) Convert 242 to binary:

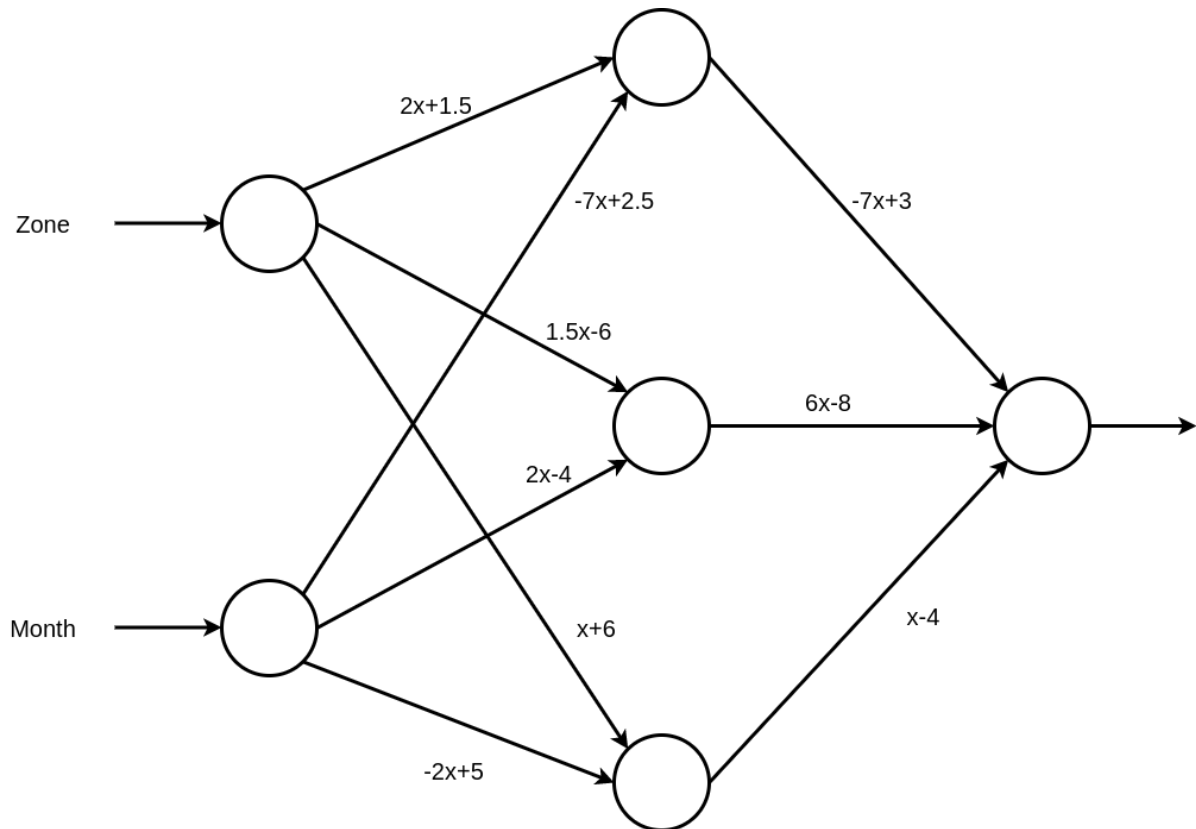
23. (3 points) Convert 10011011 to decimal:

24. (5 points) Produce the truth table for the following logical expression:

$$X \wedge Y \rightarrow \neg(X \vee Z)$$

25. (5 points) Is $\neg(P \wedge Q)$ logically equivalent to $(\neg P) \vee (\neg Q)$? Show why or why not and explain:

26. (5 points) The following network has been trained to predict how many peppers will grow on a plant by September based on the hardiness zone and month it was planted in. I'm going to plant my peppers in Charlottesville (zone 7) in April (month 4). Using this network, calculate the value of each neuron based on how I'm planting my pepper plant and tell me how many peppers I should expect based on the network's output.



4 Short Answer (19 Points)

27. (3 points) What is the importance of binary in computing?
28. (3 points) What is the difference between Personal Area Networks (PAN) and Local Area Networks (LAN)? Name one devices that would connect to a PAN and one that would connect to a LAN.
29. (3 points) Describe two benefits of cloud computing:

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30. (2 points) Explain the purpose of the frontend and backend in website architecture:
31. (3 points) When we say a model “learns” in machine learning, what do we mean?
32. (2 points (bonus)) One of the multiple choice questions was generated by a transformer model. Pick which question you think it was and explain. (1 point for choosing the right question and 1 point for your explanation. You don’t have to choose the right one to get the second point. Just explain your reasoning based on our discussions of machine learning.)