Overview of ML

a. Define ML in your own words

Machine learning is training computers to recognize patterns in data, whether it be for clustering similar data or making predictions on new data.

b. In a paragraph, summarize the importance of data, pattern recognition, and accuracy in machine learning

Machine learning requires data to be able to learn anything. Machine learning's ability to analyze an abundance of data is what makes it useful. To learn anything useful, however machine learning must be able to recognize patterns and recognize those patterns accurately for us humans to derive anything of interest (predict outcomes on future data or find similar data). So, each of these aspects of machine learning is required for it to be of use.

c. Describe the relationship between AI and ML

AI was one of the fields that pushed the frontiers of what computers could do, paving the way for machine learning. Machine learning is just one subset of artificial intelligence and other related fields.

d. List at least 2 examples of modern machine learning applications, and explain why these applications could not be built with traditional programming

One example of a modern machine learning application is facial recognition. Since the rules for what is and isn't a face aren't explicitly clear, it's not possible to encode all the rules with traditional programming. However, machine learning's pattern recognition and discovery of new knowledge can circumvent this limitation.

Another modern machine learning application is the analyzing and grouping of large amounts of data. In this case, the scale of the problem is what makes it difficult to use traditional programming. However, machine learning excels at finding patterns quickly and is much more suitable for the task.

e. In a paragraph, define the terms observation, feature, quantitative data, and qualitative data and discuss their importance in machine learning

An "observation" is a single data point, and its "features" are what describe that data point. For example, an observation of a student could have "GPA" and "class" as features. Quantitative data is data that can be expressed

numerically while qualitative data is data that is expressed categorically. Data is at the heart of machine learning and all these terms can be expressed in a table to be analyzed. It's how predictions can be made, and similar data grouped together.

f. Write a paragraph describing your personal interest in ML and whether/how you would like to learn more about ML for personal projects and/or professional application

Genetic algorithms are what initially introduced me to machine learning concepts. I'd say it's still what I'm mainly interested in for machine learning. I think that'd more machine learning knowledge would allow me to start some fun personal projects involving games and ML.