AP Computer Science Principles
Ticket Out the Door
Set 3: Machine Learning

Name _____ Period _____

Skill 3.1 Exercise 1
What is the difference between Artificial Intelligence and Machine Learning?
Which of the following best describes the purpose of machine learning programs?
(A) To analyze large data sets, recognize patterns, and make predictions based on data (B) To automatically translate algorithms from natural language to machine language (C) To find approximate solutions to problems that would otherwise require an unreasonably long amount of time to solve (D) To determine whether an algorithm can be constructed to answer “yes” or “no” for all possible inputs

Skill 3.2 Exercise 2
Andy is using machine learning for an algorithm that classifies photos of restaurant meals by category (such as "sandwich", "curry", or "salad"). He trains a neural network on a large open database of photos of restaurant meals. He then tests the network on local restaurants and notices that the Ethiopian restaurant meals aren't classified correctly.
What time of learning machine learning model is Andy probably using?
What's the best way to improve the machine learning algorithm's ability to recognize Ethiopian meals?

AP Computer Science Principles
Ticket Out the Door
Set 3: Machine Learning

Name _____ Period _____

Skill 3.2 Exercise 3

Creating a Machine Learning (ML) model isn't as hard as you think! Follow the steps below to create and test an ML model.

- ☐ Navigate to https://machinelearningforkids.co.uk/
- ☐ Click on the *Get started* button
- ☐ Click the *Try it now* button
- ☐ Click *Add a new project*
- ☐ Decide on a name for your project (cat detector, money detector, mood detector, etc.) and enter it
- ☐ Select recognizing images for the Project Type
- ☐ Select In your web browser for the Storage
- ☐ Click *CREATE*
- ☐ Click on the project landing area that is created
- ☐ Click on the *Train* button to start training your model
- ☐ Click on the *Add new label* button, you can call this label whatever you want for example (sad, happy, angry, etc). You need at least two labels for example: Happy and Not Happy
- ☐ Draw pictures, use your webcam, or find pictures on the Internet to train your model (You need at least images for each label)
- ☐ When you are done, click on the *Back to project* link
- ☐ Click on the *Learn and Test* button
- ☐ Click on the *Train new machine learning model* button
- ☐ Test out your model with your webcam, drawing, or link to an image

What was the name of the Machine Learning Model you created?

The results of your model are reported as a percentage. How accurate was your model with the image you tested? Indicate the percentage.

How might you improve your model?

Skill 3.3 Exercise 1

Would you rather have a human or an algorithm screen you for a job? If you knew that an algorithm was reviewing your résumé, what would you change?

AP Computer Science Principles
Ticket Out the Door
Set 3: Machine Learning

Name _____ Period _____

Skill 3.3 Exercise 2

A national bank opts to use machine learning for deciding whether to award loans to applicants. The engineers create the algorithm by training a neural network on their large database of previous loan applications and decisions (made by loan officers). After they start using the algorithm for new loan applicants, they receive complaints that their algorithm must be biased, because *all* the loan applicants from a particular zip code are *always* denied. Explain?

Skill 3.4 Exercise 1

A software company is designing a mobile game system that should be able to recognize the faces of people who are playing the game and automatically load their profiles. Which of the following actions is most likely to reduce the possibility of bias in the system?

(A) Testing the system with members of the software company's staff

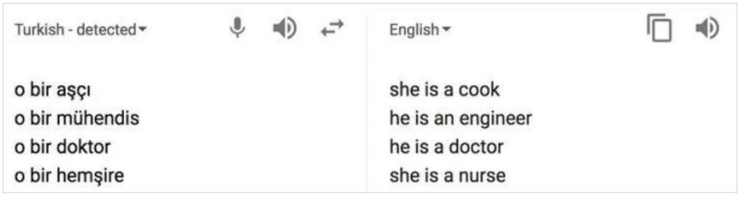
(B) Testing the system with people of different ages, genders, and ethnicities

(C) Testing the system to make sure that the rules of the game are clearly explained

(D) Testing the system to make sure that players cannot create multiple profiles

Skill 3.5 Exercise 1

Neural Machine Translation (NMT) is trained on example text that exist in the world. Consider the Google Translate that was constructed using NMT.



What is the bias in this translation.

How might Google Engineers modify the translation to remove bias?

AP Computer Science Principles
Ticket Out the Door
Set 3: Machine Learning

Name _____ Period _____