EE 104 Documentation
Lab 9
Youtube Links
:https://youtu.be/PJJBgZHQCuc
https://youtu.be/Wr5IPfKIvTw
https://youtu.be/zv52v2LuoBw

```
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Total number of loans: 5960
Number of loans in each risk category:
High Risk      2189
Medium Risk    1915
Low Risk       1187
Name: Risk_Level, dtype: int64
Risk level recommendations for each loan:
       LOAN Risk_Level Risk_Recommendation
0      1100  High Risk              Reject
1      1300  High Risk              Reject
2      1500  High Risk              Reject
3      1500  High Risk              Reject
4      1700  High Risk              Reject
...     ...        ...                 ...
5955  88900        NaN
5956  89000        NaN
5957  89200        NaN
5958  89800        NaN
5959  89900        NaN

[5960 rows x 3 columns]
```

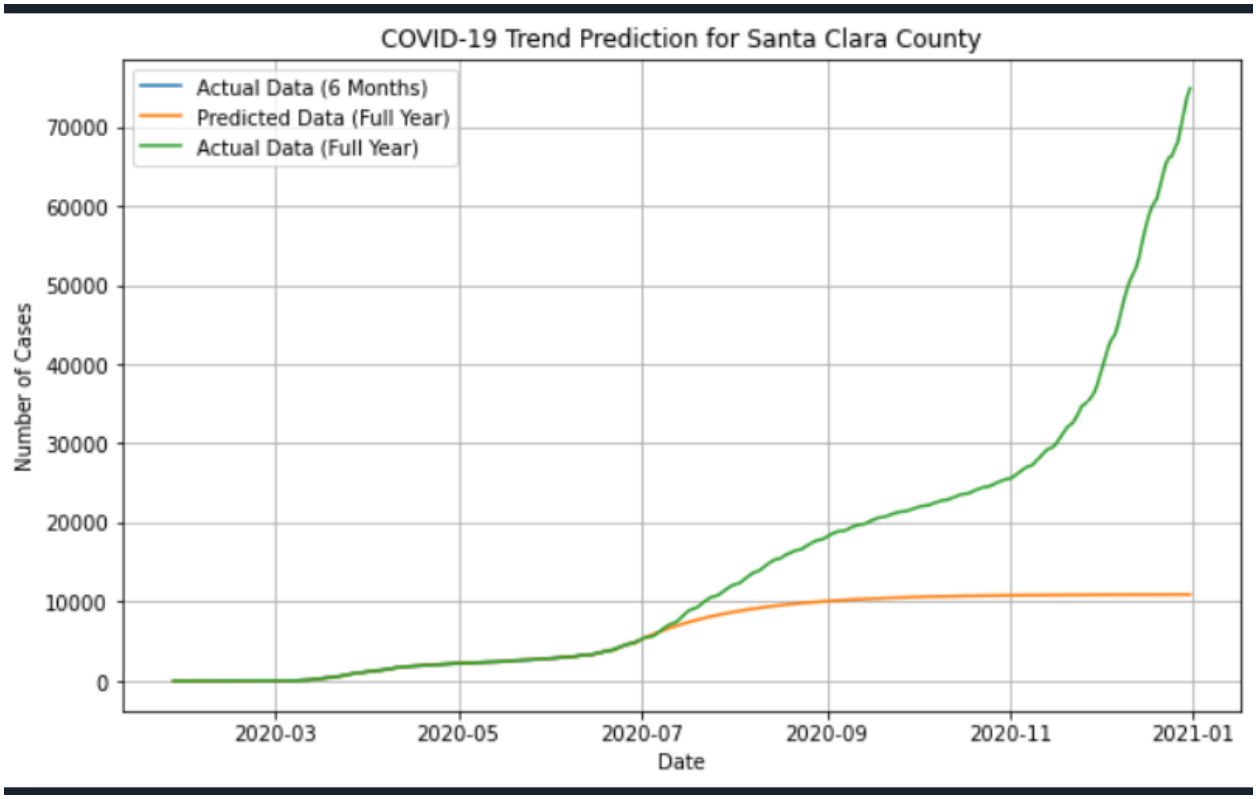

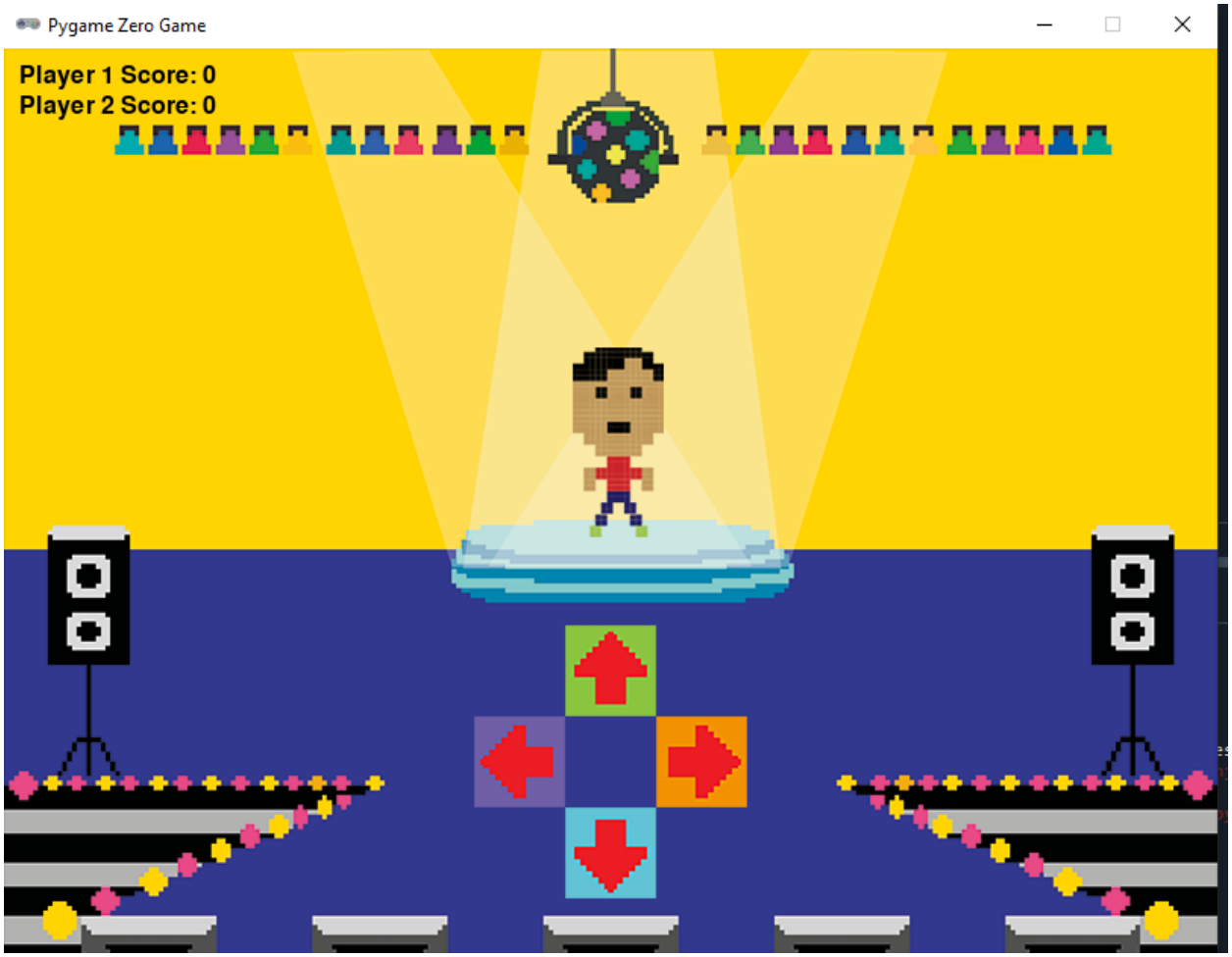
Pygame Zero Game
Player 1 Score: 0
Player 2 Score: 0

1.Differentiate between a list and a tuple in Python.
A list is mutable, ordered, and allows duplicate elements. It is defined using square brackets ([]). A tuple is immutable, ordered, and allows duplicate elements. It is defined using parentheses (()).

2. How do you create a virtual environment in Python?
To create a virtual environment, you can use the venv module in Python. Open the command prompt and run the command python -m venv myenv to create a virtual environment named myenv.

3. What are the different types of operators in Python
Python supports various types of operators, including arithmetic operators, comparison operators, logical operators, assignment operators, bitwise operators, and more.?

4. Explain the concept of a module in Python.
In Python, a module is a file containing Python code that defines functions, classes, and variables. It serves as a way to organize and reuse code by encapsulating related functionality into a single file.

5. How do you open and read a file in Python?
You can open and read a file in Python using the open() function and the file object's read()

6. What is the difference between a shallow copy and a deep copy in Python?
Shallow copy creates a new object that references the original elements. Changes made to the new object will affect the original object. Deep copy creates a completely independent copy of an object and its nested objects, ensuring that changes in one do not affect the other.

7. What Are the Different Types of Machine Learning?
Supervised Learning, Reinforcement Learning and Unsupervised Learning

8. What Are the Three Stages of Building a Model in Machine Learning?

- Model Building

  Choose a suitable algorithm for the model and train it according to the requirement

- Model Testing

  Check the accuracy of the model through the test data

- Applying the Model

  Make the required changes after testing and use the final model for real-time projects

9.What is Deep Learning?

The Deep learning is a subset of machine learning that involves systems that think and learn like humans using artificial neural networks. The term ‘deep’ comes from the fact that you can have several layers of neural networks.

10.What Are Unsupervised Machine Learning Techniques?

Clustering problems involve data to be divided into subsets. These subsets, also called clusters, contain data that are similar to each other. Different clusters reveal different details about the objects, unlike classification or regression. In an association problem, we identify patterns of associations between different variables or items.

11.What is the Difference Between Supervised and Unsupervised Machine Learning?

- Supervised learning - This model learns from the labeled data and makes a future prediction as output
- Unsupervised learning - This model uses unlabeled input data and allows the algorithm to act on that information without guidance.

12. What is a Random Forest?

A ‘random forest’ is a supervised machine learning algorithm that is generally used for classification problems. It operates by constructing multiple decision trees during the training phase. The random forest chooses the decision of the majority of the trees as the final decision.

13. Define Precision and Recall.

Precision

Precision is the ratio of several events you can correctly recall to the total number of events you recall (mix of correct and wrong recalls).

Precision = (True Positive) / (True Positive + False Positive)

Recall

A recall is the ratio of the number of events you can recall the number of total events.

Recall = (True Positive) / (True Positive + False Negative)

14. What is Cross-Validation?
Cross-Validation in Machine Learning is a statistical resampling technique that uses different parts of the dataset to train and test a machine learning algorithm on different iterations. The aim of cross-validation is to test the model's ability to predict a new set of data that was not used to train the model. Cross-validation avoids the overfitting of data.

15. What is Tensorflow, and What is It Used For?
TensorFlow is an open-source software library initially developed by the Google Brain Team for use in machine learning and neural networks research. It is used for data-flow programming.

16. What are Neural Networks, and How Do They Relate to AI?
Neural networks are a class of machine learning algorithms. The neuron part of the neural is the computational component, and the network part is how the neurons are connected. Neural networks pass data among themselves, gathering more and more meaning as the data moves along

17. What is Automatic Programming?
Automatic programming is describing what a program should do, and then having the AI system "write" the program.

18. How Many Different Kinds of Agents Exist in Artificial Intelligence?

- Simple Reflex Agents

Simple reflex agents behave only in response to the present circumstance without taking into account the previous record of the surroundings or the ways in which the ecosystem has interacted with it.

- Simulation-Based Reflex Agents

These models form their perceptions of the environment based on the models that have been established. This model also maintains track of the internal circumstances, which may be altered based on the changes that are done to the surrounding environment.

- Goal-Based Agents

The actions taken by agents of this kind are dictated by the objectives that have been assigned to them. Their entire aim is to accomplish that objective. If the agent is given a choice between many different options, it will choose the one that brings it one step closer to achieving its objective.

- Utilitarian Agents

Reaching a goal isn't always enough. To reach your destination, you must choose the quickest, safest route possible. Agents use utility-based decision-making decisions based on the utility (preferences) of various options.

- Educative Agents

These sorts of agents are able to gain knowledge from their previous encounters.

19.What is a Chatbot?
A chatbot is a computer program with artificial intelligence (AI) that can converse with humans using natural language processing. The communication may take place on a website, via an application, or through one of the several messaging applications.

20. What is a Rational Agent, and What is Rationality?
A rational agent is a system that makes decisions based on maximizing a specific objective. The concept of rationality refers to the idea that the agent's decisions and actions are consistent with its objectives and beliefs. In other words, a rational agent is

one that makes the best decisions possible based on the information it has available. This is often formalized through the use of decision theory and game theory.

21.What is Game Theory?

Game theory is the study of decision-making in strategic situations, where the outcome of a decision depends not only on an individual's actions, but also on the actions of others. It is a mathematical framework for modeling situations of conflict and cooperation between intelligent rational decision-makers. Game theory is used to analyze a wide range of social and economic phenomena, including auctions, bargaining, and the evolution of social norms.

22.What is a Data Structure?

- A data structure is a storage format that defines the way data is stored, organized, and manipulated.
- Some popular data structures are Arrays, Trees, and Graphs.

23. What is a Linked List?

- Like an array, a linked list refers to a linear data structure in which the elements are not necessarily stored in a contiguous manner.
- It is basically a sequence of nodes, each node points towards the next node forming a chain-like structure.

24.What is LIFO?

- LIFO is an abbreviation for Last In First Out
- It is a way of accessing, storing and retrieving data.
- It extracts the data that was stored last first.

25.What is Recursion?

- Recursion refers to a function calling itself based on a terminating condition.
- It uses LIFO and therefore makes use of the stack data structure.

26.What is a Deque?

- deque is a double-ended queue.
- This is a structure in which elements can be inserted or removed from either end.

27. What's the difference between Stack and Array?

Stack	Array
Stack follows a Last In First Out (LIFO) pattern. What this means is that data access necessarily follows a particular sequence where the last data to be stored is the first one that will be extracted.	On the other hand, Arrays do not follow a specific order, but instead can be accessed or called by referring to the indexed element within the array.

28. How do you find the factorial of an integer?

- A factorial is a function that multiplies a number by every number below it. For example, 5!= 5*4*3*2*1=120.

29.What is FIFO?

- FIFO stands for First In First Out.
- It is a way of accessing, storing and retrieving data.
- The data that was stored first is extracted first.

30. What are Binary Trees?

- A binary tree is an extension of the linked list structure where each node has at most two children.
- A binary tree has two nodes at all times, a left node and a right node.