(1) AntBot: Ant Colonies for Video Games
  (a) You can make a pacman environment using Unity software.
  (b) Give the AI to the Pacman agents.
  (c) One possible AI could be this paper
  (d) There are many other AI algorithms possibilities that you can think of.

(2) AI agent for a Game
  (a) Some possible games could be: ATARI breakout, Blokus Duo, PONG, Sushi GO, Snake game, 5 in row game, tetris game
  (b) Make sure the game has sufficient difficulty level. It should not be too simple or too hard.
  (c) Build the game environment
  (d) Write AI algorithm for agent. You are encourage to show an application of algorithms that you have learned in the class.
  (e) You may find some advance algorithms in research papers.

(3) Building Simple Chess game
  (a) Move generation and board visualization: You may use inbuilt librariesL chess.js and chessboard.js
  (b) Implement the algorithm for best move identification. Maybe minimax algorithm, alpha-bera pruning
  (c) You may try to improve evaluation function
  (d) You can consider move ordering aspect as well.
  (e) These are just starting points. Other directions could be: this

(4) AI for solving sudoku puzzles
  (a) This paper may give you some direction for problem formulation

(5) Classification problems
  (a) You can pick any problem of your interest. For example, Mail SPAM detection, Sentiment classification, digit classification etc.
  (b) You can use standard datasets from kaggle etc. Do the analysis on the dataset to find out whether it is balanced classification or imbalance. Based on this which metric you would like to choose for evaluation and why?
  (c) You can try multiple systems to see which works best.
  (d) You can also show some insights from error analysis. What kind of mistakes and why?
  (e) You are encourage to add more functionalities to improve the performance. For example, by building a better feature representation, trying different architecture, doing fine tuning, or by handling data imbalance.

(6) You can have your own project based on your idea which shows AI application
  (a) You may take inspiration from these projects. Do not choose a project which needs GPU computing. Prefer only those which are manageable with colab.

7) Simulate a Federated Learning setup.

Choose a dataset and partition it. Explore algorithms such as FedProx and FedAvg to train a Neural Network on the dataset you have chosen.

Make an attempt to investigate the privacy preserving properties of your algorithm.

Experiment with different data partitioning schemes. Does it affect the accuracy of your global model ?

8) You may attempt to work on the applications of A* algorithm. Model scenarios from domains that require you to find the shortest path between two nodes. The scenario should be reasonably complex.

Formulate multiple heuristics for the scenario and comment on the optimality of the A* algorithm for each of these heuristics. Can you modify the A* algorithm to find the longest path between two nodes ? What if the environment that you have modeled is dynamic i.e. it is continuously changing ? How does A* perform with respect to each of the heuristics ? Can you incorporate the behavior of the environment to inform A* search ? Try to give a visual demonstration if possible. Supplement your report with graphs.