# CS 2520 Team Project (100 points**)**

**Goal:** Develop a Python program to solve a real-world problem.

**Teams**: A team should consist of 2 or 3 members. Sign up on Canvas -> People -> Team Project by Monday, April 3rd.

**Topics:** Each team should come up with a specific project topic. We’d have a diverse set of topics, thus ***no more than two teams*** could work on the same “category” (For example, maximum two teams could work under “machine learning” category.) To post your topic, each team creates a thread under the forum on Canvas -> Discussions -> Team Project Topic (one team per thread, you can modify your topic by replying to original post prior to due date). Due date: Wednesday, April 5th. I will notify the team(s) in case any revision needed. We will finalize/confirm the project topics by Monday, April 10th.

**Project demo and presentation (week 15 and/or Finals week)**

Every team member should speak at the presentation. Suggested coverage:

Problem statement (clearly state what problem you’d solve)

Design ideas (how you’d solve this problem)

Key Python features used in solving the problem (explain selected segment of coding)

Demo or test runs your project

**Project submission *(due: by the end of presentation day)***

One presentation slides (pptx or pdf file) including the following:

(1) slides that cover: problem statement and/or project goal; design ideas; key Python feature used in solving the problem

(2) One slide with a link to Python code (.py file), including a readme file or “how to run” comments on top of your code. Your Python code could be stored in github or a shared drive. Make sure proper access permission given.

(3) A few slides that cover Input/Output test runs (put a link to input data sets if applicable; output could be in screen shots, videos, or just as text file). Note: should test the program under various possible input scenarios – not necessary to cover all scenarios but with good representations.

**Grading Criteria:**

1. team and topic (10 pts) – timely submission with all required information.
2. presentation (40 pts) – clearly explanation of your project. See above suggestions.
3. Program quality (30 pts)

Successful execution of program and proper input/output test runs (20 pts)

Good use of Python features (10 pts)

1. Level of difficulties and/or use of advanced features (10 pts)
2. Presentation evaluation (timely submission, constructive comments) (10 points)

The following for your reference only. Teams feel free to select your own topics.

List of suggested problem topics (details see textbook) – note: listed are just general topic directions. Team’s responsibility to create a competent software product.

1. Compute Pi with three different methodbys (Archimedes Approach, Accumulator Approximations, Monte Carlo method): visualize accuracy and performance (i.e. execution time) for comparison and contrast. Reference: Chapter 2 of textbook.
2. A user-friendly database management system (e.g. username/password authentication system, database and GUI features) Reference: Lecture 7 Dictionaries.
3. Implementation (with GUI support) for various encryption and decryption methods. Reference: Chapter 3 of textbook, <https://cryptii.com/pipes/caesar-cipher>
4. Fractals -- use recursion and Turtle (or similar other tool for drawing). Reference: Chapter 9. Team to decide appropriate level of difficulties.
5. Data analytics with CSV or JSON files (Example: processing data stored in CSV file to get statistical or other meaningful information.) Reference: Chapters 4 and 5 of textbook.
6. Image processing (transform images in various ways.) Reference: Chapter 6 of textbook.
7. Implementation of the planet objects problem with visualization. Reference: Chapter 10 of textbook.
8. Simulation in object-oriented approaches (e.g. game of life) supported by GUI. Reference: Chapter 11 of textbook.
9. Graphics in object-oriented approaches. Reference: Chapter 12 of textbook.
10. Any topic proposed by teams (e.g. pygames, parallel processing, using regular expressions, …)