

- Report should be written in English. For codes, please turn in your Jupyter notebook file, including your codes and testing results.
  - Your report should include intermediate steps, necessary discussions as well as the Python codes and results.
  - Submit your report to Blackboard before deadline
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1. **System Installation:** In this class, we will be using Python and Drake (a robot simulator) in class and also for homework and projects. Drake runs on Mac-OS or Ubuntu. If you do not have a Mac computer, please install Ubuntu either directly on your computer or through Windows Subsystem for Linux (WSL). Installation tutorial is posted on the class website. You don't have to follow all the steps in the tutorial. As long as you have a working Ubuntu system and Python environment, you are good to go. For this homework, please attach your Ubuntu (or macOS) snapshot, and your Python coding environment.
2. **Python Basics:** Please carefully study the Python tutorial posted on the class website, and complete the following questions
  - (a) Write a program to display the current date and time.
  - (b) Write a program to print a specified list after removing the 0th, 4th and 5th elements.
    - **Sample List** : ['Red', 'Green', 'White', 'Black', 'Pink', 'Yellow']
    - **Expected Output** : ['Green', 'White', 'Black']
  - (c) Define a class called *Student* that includes the student's name and age information. In addition, you should provide a method to display these information.
3. **Linear Algebra:** In this class, it is important to use Python to complete the linear algebra task. Let's get familiar with it now.

$$A = \begin{bmatrix} 1 & -2 & 4 \\ 1 & -1 & 1 \\ 1 & 0 & 0 \\ 1 & 1 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 1 & 2 & 3 \\ 1 & 2 & 3 \end{bmatrix} \quad b = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 0 \end{bmatrix}$$

- (a) Print the two matrices  $A$  and  $B$ .
  - (b) Print the second row of  $A$  and the third column of  $B$ .
  - (c) Print the results of  $A + B$  and  $A - B$ .
  - (d) Construct a new  $4 \times 6$  matrix  $[A, B]$  by appending  $B$  to the right of matrix  $A$ .
  - (e) Compute  $A^T B$
4. **Matplotlib**
    - (a) Plot a unit circle
    - (b) Plot 10 plus signs "+" uniformly distributed on the unit circle.