

MIDDLE TENNESSEE STATE UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE

CSCI-3080 DISCRETE STRUCTURE

OLA8: Graphs and Algorithms

Instructor: Dr. Xin Yang

Due date: Nov 15th, 2021 (23:59 PM)

November 8, 2021



1. Download and Install Anaconda

Windows users: <https://docs.anaconda.com/anaconda/install/windows/>

Mac users: <https://docs.anaconda.com/anaconda/install/mac-os/>

Linux users: <https://docs.anaconda.com/anaconda/install/linux/>



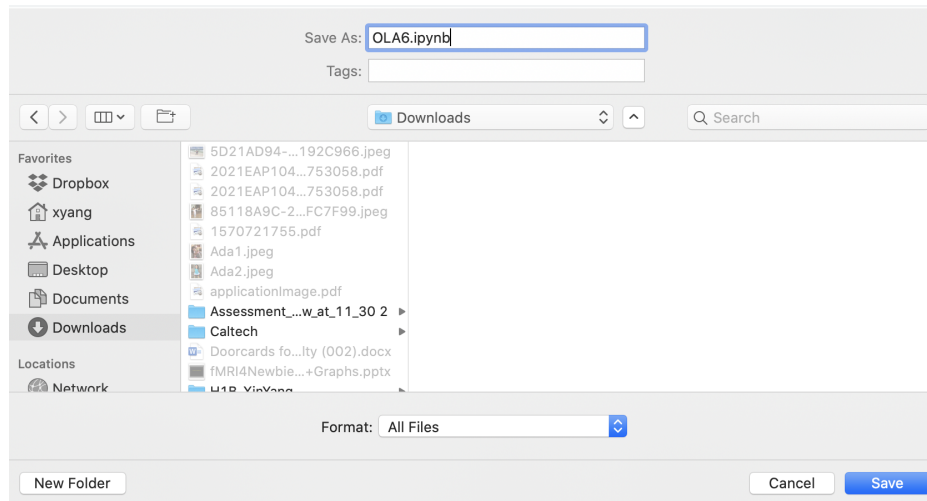
Figure 1: Anaconda: Data Science Platform

2. Download the Starter Jupyter Notebook

Please download the starter Jupyter Notebook (OLA8.ipynb) from my course calendar:

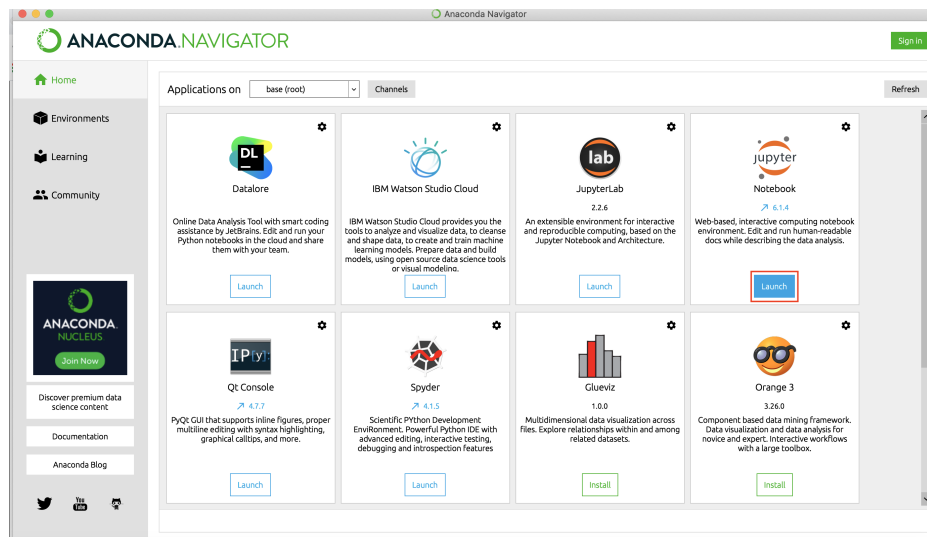
<https://www.cs.mtsu.edu/~xyang/3080/OLA/OLA8.ipynb>

- **Right click** the page.
- Click: **“Save As”**
- Select Format: **All Files**
- **Remove** the extension **.txt**.



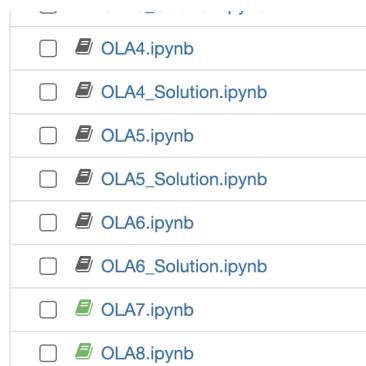
3. Launch Jupyter Notebook

- (1) Open Anaconda.
- (2) Launch Jupyter Notebook through Anaconda.



4. Open Jupyter Notebook OLA8

(1) Locate OLA8.ipynb in your Download Folder.



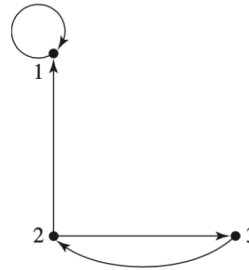
(2) You should see the following page after you click OLA8.ipynb :

```

n [7]: ### CSCI-3080 Discrete Structure
        ### OLA 8: Chapter 7 -- Graphs and Algorithms
        ### Name:
        ### Student ID:
        ### Date:

```

1. Find the adjacency matrix and adjacency relation (binary relation) for the following graph.



```

n [ ]:

```

2. Find the corresponding directed graph and adjacency relation (binary relation) for the following matrix.

$$A = \begin{bmatrix} 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

- (3) Please fill in your Name, ID, and Date.
- (4) Please finish all 10 exercises in Jupyter Notebook.

4. Save OLA8 as a PDF

(1) Please save your OLA8 as a PDF after you finish all the exercises. Please **right click** the Jupyter Notebook, then click **Print**, and **save as PDF**.

```
[ 2 ]: ### CSCI-3080 Discrete Structure
        ### OLA 6: Chapter 5 -- Matrices
        ### Name:
        ### Student ID:
        ### Date:
```

Exercise 1: Find x and y if

$$\begin{pmatrix} 1 & 3 \\ x & x+y \end{pmatrix} = \begin{pmatrix} 1 & 3 \\ 2 & 6 \end{pmatrix}$$

[]:

Exercise 2: Compute A + rD

$$\begin{pmatrix} 2 & 1 \end{pmatrix} \quad \begin{pmatrix} 4 & -6 \end{pmatrix}$$

Emoji & Symbols

Undo

Redo

Cut

Copy

Paste

Paste and Match Style

Select All

Print...

Language Settings

Writing Direction ►

Inspect

```

In [2]: ### CSCI-3080 Discrete Structure
        ### OLA 6: Chapter 5 -- Matrices
        ### Name:
        ### Student ID:
        ### Date:

```

Exercise 1: Find x and y if

$$\begin{pmatrix} 1 & 3 \\ x & x+y \end{pmatrix} = \begin{pmatrix} 1 & 3 \\ 2 & 6 \end{pmatrix}$$

In []:

Exercise 2: Compute A + rD

$$A + rD = \begin{pmatrix} 2 & 1 \\ -1 & 0 \\ 3 & 4 \end{pmatrix} + 3 \begin{pmatrix} 4 & -6 \\ 1 & 3 \\ 2 & -1 \end{pmatrix} \quad \eta$$

In []:

In []:

Exercise 3: Compute B·D

$$B \cdot D = \begin{pmatrix} 4 & 1 & 2 \\ 6 & -1 & 5 \\ 1 & 3 & 2 \end{pmatrix} \cdot \begin{pmatrix} 4 & -6 \\ 1 & 3 \\ 2 & -1 \end{pmatrix}$$

In []:

In []:

Exercise 4: Solve the system of equations using Gaussian Elimination

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Print 2 pages

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5. Submission

1. log in the gus sytem using your **cNumber** and **Pass-word**:

<https://www.cs.mtsu.edu/cgi-bin/gus/gus.py>

cs.mtsu.edu/cgi-bin/gus/gus.py

Apps fMRI Study--Simu... Big Data, Data Mi... Index of

GUS: Homework repository system start screen.

Please enter your C-number and Password below:

C-number: c8055500

Password:

Enter Help

Clear Entries

2.
 - (a) Select **ola8** from the drop-down menu.
 - (b) Click **Submit**
 - (c) Click **Perform Action**

Action options:

Select an assignment from the dropdown menu and check an action on right:

ola8 (Deadline: 2021-11-15 23:59) Submit Status/Retrieval Perform Action

Reset Back Close

3.
 - (a) click **Choose File** to attach your OLA8.pdf
 - (b) click **Upload**.

To submit ola8, upload these required files:

OLA8.pdf

OLA8.pdf

OLA8.pdf

(*↔Once pressed, wait for next screen. A succesful upload can take a fe*

4. Congratulations! You are done with OLA8!

```
Preparing ola8 submission of the following file(s):
```

```
/tmp/c8055500/*
```

```
The following file(s) were successfully submitted:
```

```
OLA8.pdf
```

```
Nov 07 20:52 c8055500
```

```
233804 bytes
```

```
SUCCESS: ola8 submitted.
```

Check status line above to see if submission was successful.