

Math 451 / Project (on blackboard) → Djk.m

Project 7 - Group Project

Part 1 ... Calculus Toolbox Sub-Project

- No one in your entire group can make changes to their calculus toolbox as of April 26.
- Get the calculus toolbox of one of the members of your group that is NOT in this sub-project.
- Write an evaluation of installing and using their toolbox. Check the function of each of their functions in the toolbox. Write up a report of using the toolbox like you would a software evaluation.
- Use their calculus toolbox to solve the following problems:
 - Create a function that will internally call simpint to integrate given functions, $f(x)$, and it will plot $f(x)$ along with its parabolic approximations. Test it with the integrals given in the take home for exam 3.
 - Use the linear algebra functions from the calcbox to evaluate two systems of linear equations given in the Math 511 textbook used by the math department.
 - Collect data temperature data for Wichita over the next 5 days in the following way: Each morning collect the 10 day outlook and at the end of the day collect the day's high and low temperatures. At the end of 5 days you use the 5 real highs and lows, 5 current day projections, 5 next day projections, and five 2 day projections. Perform and write up what you think is a reasonable analysis on the data using data plots and data fitting.

Part 2 ... Graph Theory Sub-Project

- You will use the djk.m and centrality.m functions for this sub-project.
- Create a function that you think gives each vertex a metric for a "middle-ness" value. Write a reasonable explanation of your metric (basically, try to convince others that it is useful).
- Use the graphs given in Project 6 to test your functions.
- Use the attached .csv file to find people of interest within the American Revolution.
- Based upon what you have learned from the American Revolution data write a project idea for using these functions to study a programming business like NetApp.

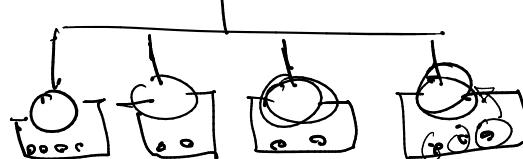
Part 3 ... Cryptography Library Sub-Project

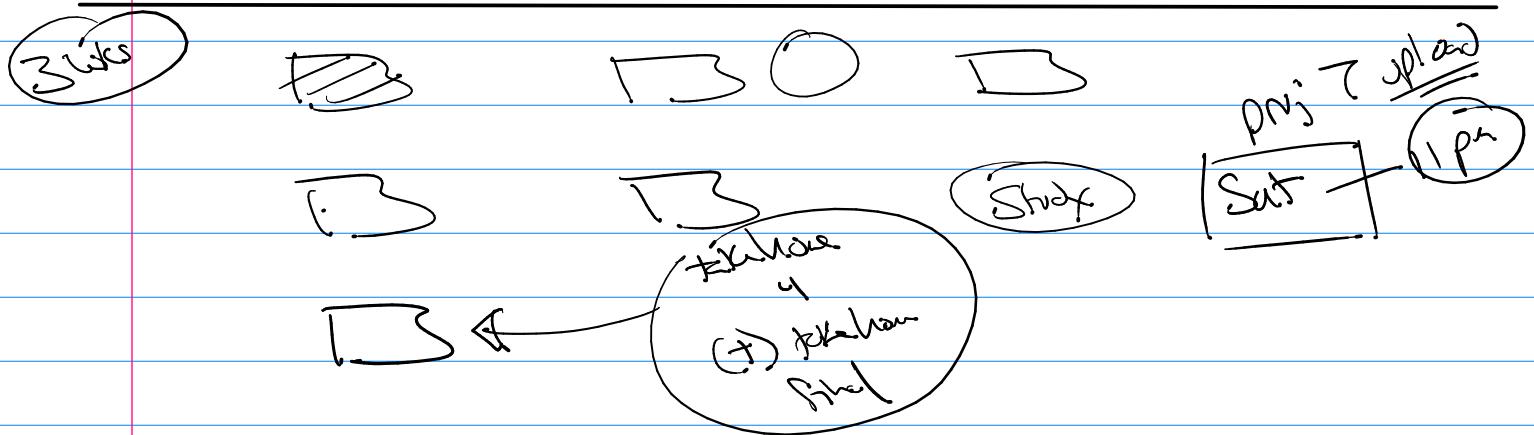
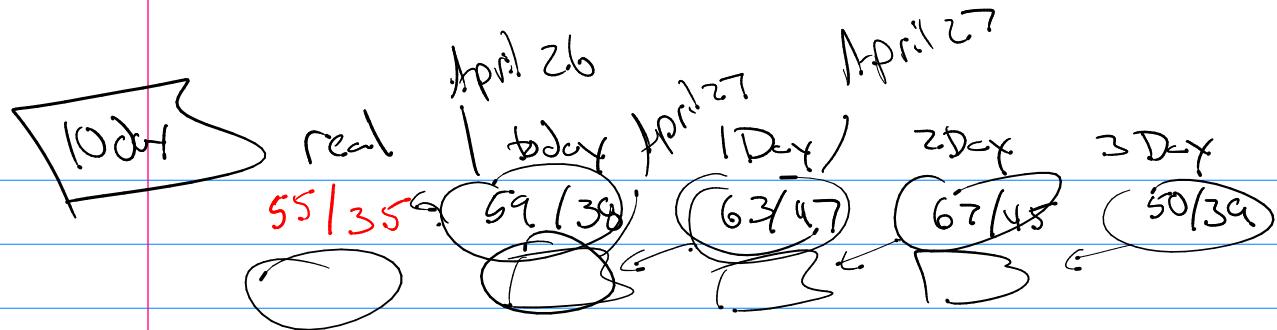
- Create the following Number Theory and Cryptographic functions: div_mod, mymod, mydiv, makeprimes, myfactor, powermod, mygcd, inverse_mod, shift, onetimepad, affine_encrypt, affine_decrypt, publickeyencrypt, publickeydecrypt, and publickeybreak.
- Create a cryptobox directory with appropriate Contents.m file.

Part 4 ... Treasure (Extra Credit for the Final) Hunt

- First clue is posted on Thursday April 27th.

Grading





Number Theory

$b \mod n \rightarrow \text{into base } 2$

$$(c_k z^k + \dots + c_2 z^2 + c_1 z + c_0) \mod n$$

$\text{base } 2 \quad c_i = 0 \text{ or } 1$

$$a^{c_k} a^{c_{k-1}} \dots a^{c_2} a^{c_1} a^{c_0} \mod n$$

$$(a^{c_k})^4 \dots (a^4)^4 (a^2)^2 (a^1)^1 (a^0)^0 \mod n$$

$a_2 = \mod(a \cdot a_1, n)$

$a_0 = \mod(a_1 \cdot a_0, n)$

Primes

$1, \sqrt{2}, \sqrt{3}, \sqrt{4}, \sqrt{5}, \sqrt{6}, \sqrt{7}, \sqrt{8}, \sqrt{9}$

Fader

See video