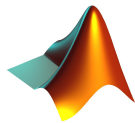# CS112 Retrospective & the Future
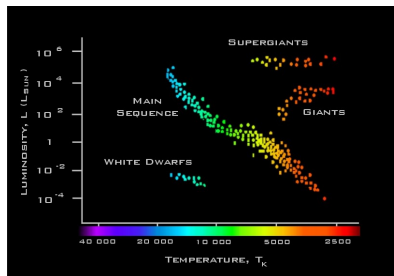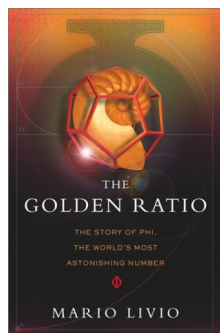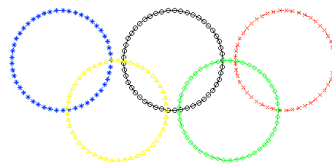
CS112 Scientific Computation
Department of Computer Science
Wellesley College

Assignment #1: Golden Ratio, Olympics, & Stars

- Variables and assignment
- Mathematical computations
- Vectors
- Plotting

Assignment #2: Conditionals, Colon Notation, Analyze/Visualize Ocean/Smartphone Data

- Conditionals
- Cell arrays
- Indexing & colon notation
- Logical values and expressions
- Data analysis and visualization

```
>> nums = 1:8
nums =
   1    2    3    4    5    6    7    8
>> nums(1:2:5) = 10
nums =
  10    2   10    4   10    6    7    8
>> nums(2:3:8) = [13 9 16]
nums =
  10   13   10    4    9    6    7   16
>> nums2 = nums([1:3 6:8])
nums2 =
  10   13   10    6    7   16
>> nums([1:3 6:8]) = 12:-2:2
nums =
  12   10    8    4    9    6    4    2
>>
```
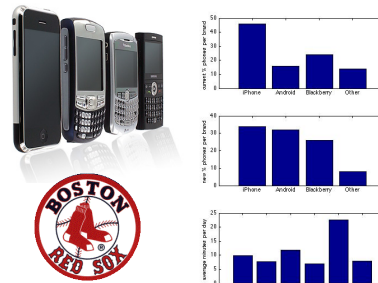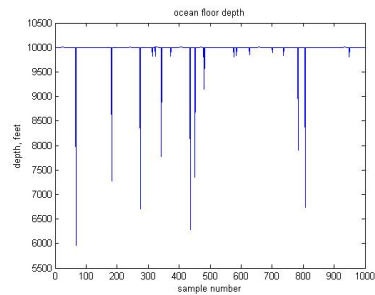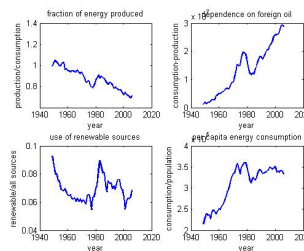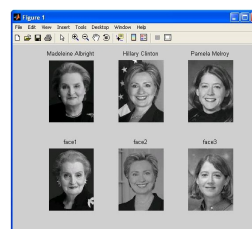

Assignment #3: Mystery, Thatcher Illusion, Gradesheets, Energy Data & Face Recognition

- Matrices
- Real and synthetic images
- Tables of data
- Image processing
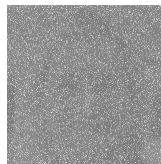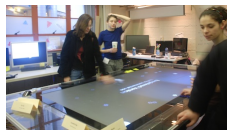
Name	Homework	Partic.	Exam 1	Exam 2	Final Project
Ann	83	90	75	80	88
Barb	79	80	80	81	70
Chelsea	90	90	92	98	94
Diana	72	75	63	75	73
Ella	88	90	78	89	82
Fiona	67	65	69	72	80

Assignment #4: Spirograph, Pole Vault, cftool, Spread of Disease

- Curve fitting & parameterized equations
- Loops
- User-defined functions
- Regression models
- Simulating models
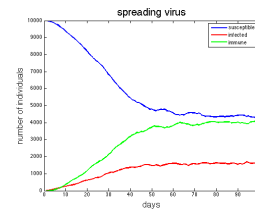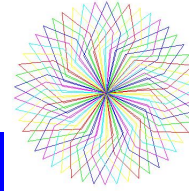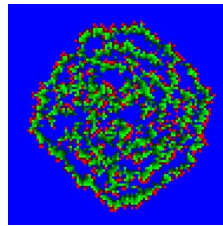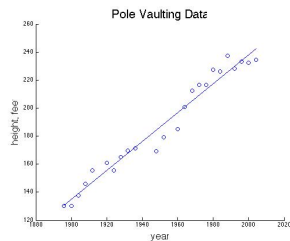
# Assignment #5: Facebook Friends, Favorite Songs, Rising Data

- Structures & storing structures in a vector
- `while` loops
- colormaps

```
>> mostFacebookFriends(students)
nora has the most Facebook friends, with 142
```

```
>> printStudentInfo(students)
andrea's favorite song is "Dark Horse" and she has 42 Facebook friends
carol's favorite song is "Team" and she has 61 Facebook friends
jean's favorite song is "Pompeii" and she has 23 Facebook friends
...
```
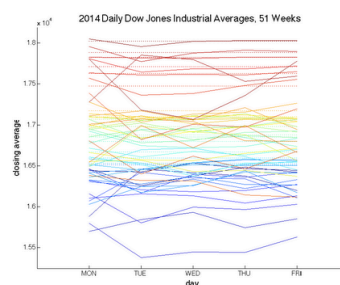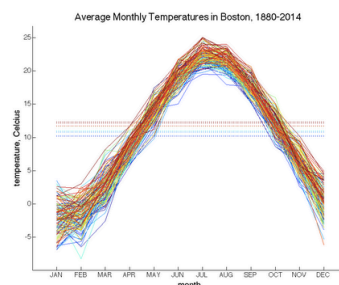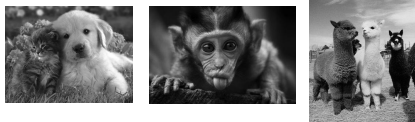
Assignment #6: GUI Sketchpad & Making Music

- Structures
- Graphics handles
- Properties
- GUIs
- Layout editor
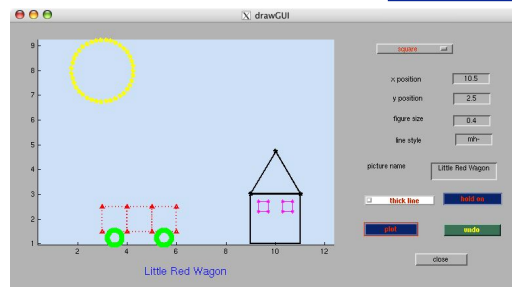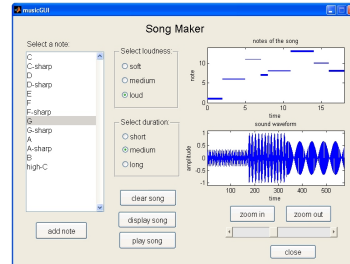
Assignment #7: Thumbnails
& Parlez-vous Francais?

- Reading/writing files
- Working with directories
- Analyzing textual data
- Cell arrays
- Frequency statistics

English		German		Finnish		French		Italian		Spanish	
e	12.31	e	18.46	a	12.06	e	15.87	e	11.79	e	13.15
t	9.59	n	11.42	i	10.59	a	9.42	a	11.74	a	12.69
a	8.05	i	8.02	t	9.76	i	8.41	i	11.28	o	9.49
o	7.94	r	7.14	n	8.64	s	7.90	o	9.83	s	7.60
n	7.19	s	7.04	e	8.11	t	7.26	n	6.88	n	6.95
i	7.18	a	5.38	s	7.83	n	7.15	l	6.51	r	6.25
s	6.59	t	5.22	l	5.86	r	6.46	r	6.37	i	6.25
r	6.03	u	5.01	o	5.54	u	6.24	t	5.62	l	5.94
h	5.14	d	4.94	k	5.20	l	5.34	s	4.98	d	5.58


```
Spanish   19.19    entre broma y broma, la verdad se asoma
German    36.33    viele koche verderben den brei
Finnish   21.68    ihmetapauksiin voi toivoa mutta ala luota niihin
French    13.03    il faut battre le fer pendant qu'il est chaud
English   10.55    this great english sentence is too long and trite
Italian   10.26    con piacere colgo l'occasione di ringraziare tutti gli amici italiani che con i loro consigli
```

4

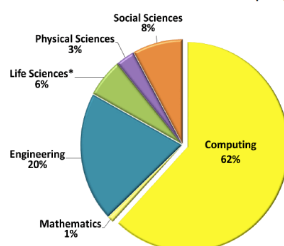# Assignment #8: Mobius Strip, Campus Places, Reaching for the Stars

- Types of numbers
- Color images & colormaps
- 3D visualization

The Centre of the Milky Way
(VLT YEPUN + NACO)
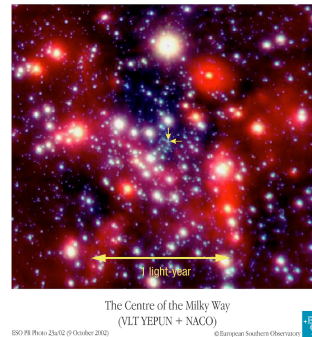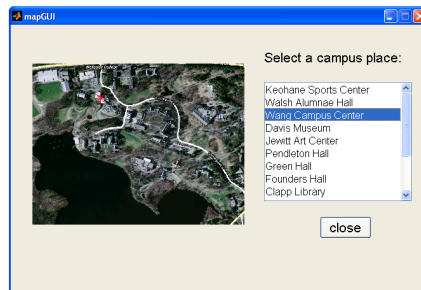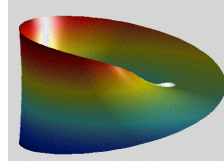
What else is there in CS?

- Having taken CS112, you have the tools to solve fundamental problems with computer programs

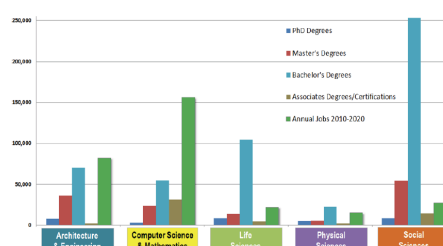- In future computational courses, you can investigate more complex and creative problems

What next in CS?

CS 112 Computation for the Sciences

↓

CS 220 Human-Computer Interaction

&

CS 240 Introduction to Machine Organization

&

CS 332 Visual Processing by Computer and Biological Vision Systems

CS 111 Computer Programming and Problem Solving

↓

CS 230 Data Structures

↓

CS 232 Artificial Intelligence

&

CS 249 Data Analytics and Visualization

&

CS 313 Computational Biology