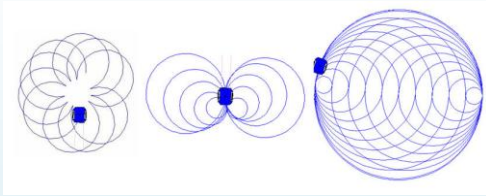




3.04 Round and Round

Python

Write user-defined function to create repetitive circular patterns.

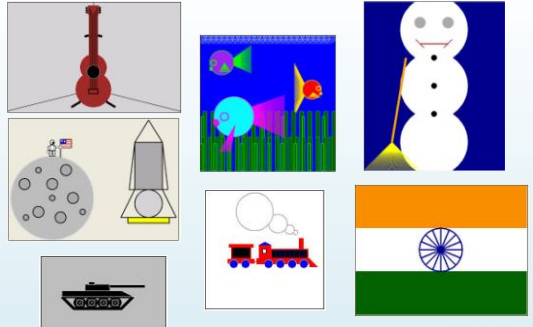


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3.05 Zelle Graphics Functions

Python

Use graphics functions to create a picture.



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4.04 IR Sensor

Python

Program the robot to navigate the perimeter of an enclosed space by detecting the walls.



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4.04 Light Seeker

Python

Program the robot to move toward a bright light in its environment.

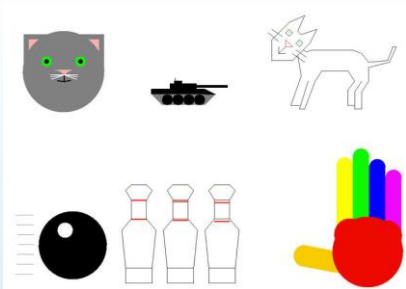


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7.02 Turtle Graphics Methods

Java

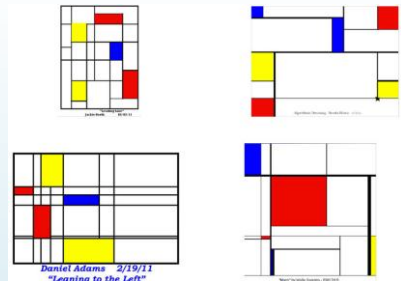
Draw a picture with Turtle graphics methods.



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7.03 Intro to Object Oriented Programming

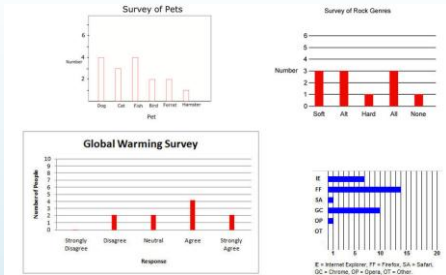
Java



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7.04 Iterations with for Loops Java

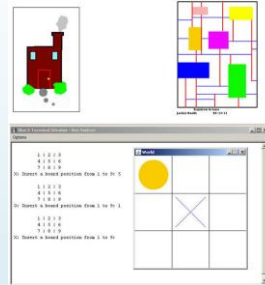
Plot survey results on a bar graph using **Turtle** graphics methods.



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7.07 Module Project Java

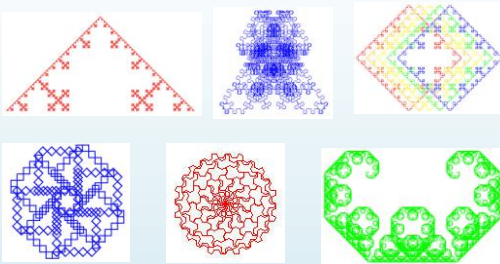
Extend the media computing concepts learned in this module by adding new functionality to a previously written program (or write a new program).



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8.01 What Condition is Your Condition In Java

Write a program to draw a fractal using a string of characters to define the base pattern (L-System).



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8.02 Manipulating Colors Java

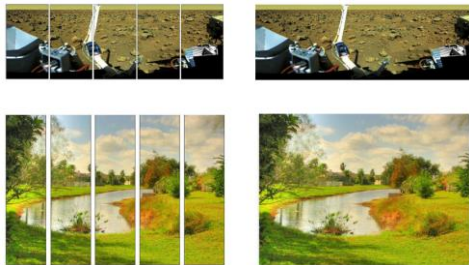
Manipulate the individual pixel colors of a digital image to produce a variety of special effects.



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8.03 Copying Pixels Java

Stitch together individual images to form a panorama.



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8.05 Logical Operators Java

Convert a color image to gray scale and reapply color with a user-defined palette.



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8.07 Module Project

Java

Extend the media computing concepts learned in this module by adding new functionality to a previously written program (or write a new program).



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9.01 Chroma Key

Java

Replace the background of an image using the chroma key technique.

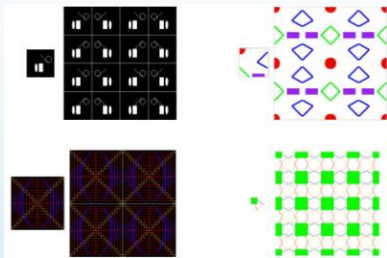


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9.03 Drawing on a Plane

Java

Use Graphics2D methods to horizontally and vertically mirror individual panels into a composite picture.

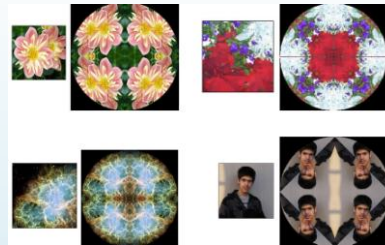


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9.04 Kaleidoscopic Images

Java

Create a kaleidoscopic image by diagonal, vertical, and horizontal mirroring.

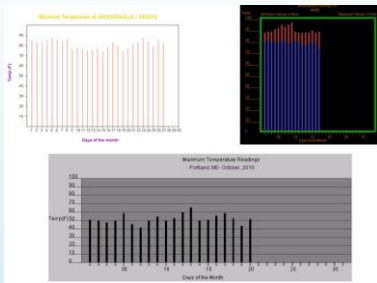


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9.05 Reading from the Web

Java

Plot the maximum daily temperature for a specific city using data retrieved directly from the National Weather Service web site.

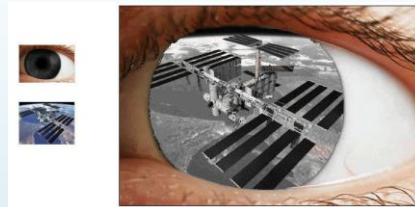


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9.07 Module Project

Java

Extend the media computing concepts learned in this module by adding new functionality to a previously written program (or write a new program).



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### Segment 1



#### Java basics

By solving real world problems, students learn Java basics and transitions into OOP.

### Segment 2



#### Advanced topics and application

Skills develop in more advanced topic such as recursion, inheritance, and algorithms (searching and sorting). The GridWorld Case Study is covered.



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- For the data structure, use either an array of objects or an `ArrayList`.
- Create a minimum of five different objects.
- Your CO2 footprint should account for the following:
  - annual estimate of gasoline used
  - annual estimate of electricity used
  - annual household waste produced
  - annual household waste recycled
  - replacement of incandescent bulbs
- The constructor should include the following parameters:
  - annual gasoline used
  - average electricity bill and average electricity price
  - number of people in home
  - recycle paper, plastic, glass, or cans (Booleans)
  - number of light bulbs replaced



**Expected Output:** When your program runs correctly you should see output similar to the following screen shot. (Your results will show five rows of data.)

Gas	Pounds of CO2 Emitted from Electricity	Waste	Pounds of CO2 Reduced from Recycling	New Bulbs	CO2 Footprint
48000.00	16440.00	1018.00	422.00	100.0	64935.99
38400.00	16111.20	3054.00	691.80	500.1	56373.35

### I Have A Dream

Five score years ago, a great American, in whose symbolic shadow we stand, signed the Emancipation Proclamation. This momentous decree came as a great beacon light of hope to millions of Negro slaves who had been seared in the flames of withering injustice. It came as a joyous daybreak to end the long night of captivity.

Plaintext	Encrypted	Key		
A 535	0.0772	N 464 0.0669	OAXFI	First
B 108	0.0155	O 581 0.0838	A	I
C 176	0.0254	P 96 0.0138	AHZSAZPZ	believe
D 244	0.0352	Q 6 0.0008	IQKI	that
E 866	0.1250	R 408 0.0589	IQAF	this
F 218	0.0314	S 404 0.0583	WKIAYW	nation
G 169	0.0244	T 652 0.0941	FQYHVS	should
H 361	0.0521	U 173 0.0249	GYNNAI	commit
I 530	0.0765	V 77 0.0111	AIFZSO	itself
J 20	0.0028	W 150 0.0216	IY	to
K 51	0.0073	X 5 0.0007	K6QAZPAWT	achieving
L 330	0.0476	Y 112 0.0161	IQZ	the
M 185	0.0267	Z 5 0.0007	TYKS	goal

### 08.12 Challenge Program



#### VIP Mentor Comments:

In the years to come, you will be hearing more and more about CO<sub>2</sub> footprints and your individual impact on the greenhouse effect. We hope that focusing on different aspects of this issue as you learned about object-oriented programming has raised your awareness. There are many steps you can take to reduce your GHG emissions, including replacing incandescent light bulbs with new energy efficient light bulbs, recycling, turning the thermostat down in the winter and up in the summer, as well as driving less or driving more fuel-efficient cars, and even planting trees. In this final assignment you will use some of the results of earlier programs and some of these additional emission reduction practices to model your CO<sub>2</sub> footprint.

Thiago da Silva  
CSA Green Team Co-Director



#### Assignment 08.12:

**Title:** 08.12 Challenge Program

**Instructions:** Write a program that models individual CO<sub>2</sub> production and reduction.

In previous assignments you have calculated your annual gasoline and home electricity consumption, both of which emit significant amounts of CO<sub>2</sub>. You also calculated your annual CO<sub>2</sub> emissions based on the waste produced in your home and how that can be reduced by recycling. CO<sub>2</sub> emissions can also be reduced by changing incandescent light bulbs to compact fluorescent light bulbs, planting trees, and more closely regulating your home's thermostat. In this final assignment, you will determine your individual CO<sub>2</sub> footprint based on the following:

- Download the [08.12 Assignment Instructions](#) to the Mod08 Documents folder.
- Print a copy of the document for your notebook.
- Carefully read the instructions and complete the assignment.

### 14.07 Challenge Program



#### VIP Mentor Comments:

This is the most involved assignment you have attempted thus far in the course. However, if you follow the plan provided in the instructions, you will be successful. The key to success is to understand the big picture, then tackle each piece of the program one step at a time. Do not try to solve it all at once or you will be overwhelmed. First, concentrate on just the frequency analysis; you need the results to do the rest of the assignment. Once you complete the frequency analysis, your instructor will provide you with a coded message. Analyze the occurrence of letters in the coded message and decide which letters in the plaintext and the ciphertext correspond. There is a lot of the IO in this assignment; so carefully review reading and writing files. Also, think about which data structure to use to store the key—arrays and `ArrayLists` work equally well. Finally, evaluate the accuracy of the decryption. It is entirely possible that the initial results will be off and that is where human analysis comes into play; you may have to adjust your key, based on context clues in the cipher text. There are only a limited number of one- and two-letter words. Verify that they were correctly translated. If you find the letter z replacing a one-letter word, you know that is not correct, so change the key accordingly. Also, you may find partially translated words that give clues. For example, if you see anchovy pizza, you can be pretty sure that the letter x should be an a. Adjust the key to reflect this context clue. I hope you enjoy this challenging assignment.

Azmir Aziz  
CSA NACE Project Manager



#### Assignment 14.07:

**Title:** 14.07 Challenge Program

**Instructions:** Write a program to perform a frequency analysis of the letters in a message and use the results to decipher a secret message.

- Download the [14.07 Assignment Instructions](#) to the Mod14 Documents folder.
- Download the [14.07 Tutorial Lecture Notes \(part 2\)](#) to the Mod14 Documents folder.
- Print a copy of the documents for your notebook.
- Carefully read the instructions and complete the assignment.
- You will need a plaintext document to use for the frequency analysis. You may use one of your own, or download this [plaintext.txt](#) document instead.
- Download the [ciphertext.txt](#) document to the project folder after you have written your frequency analysis program.
- After you have completed the frequency analysis of the plaintext and the ciphertext, you will be able to decode the encrypted code in the [secretmessage.txt](#) document.

### 2010 Results AP Computer Science

	Florida	Nation	FLVS
Pass Rate	45%	65%	99%
Average	2.47	3.14	4.54

✦90 FLVS Students took the APCS Exam = 8% of Florida

✦30% of the 5s in Florida were made by FLVS students.

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## Computer Science and STEM

- Projects all related to STEM areas
- Computer Science belongs in STEM and supports all other areas
- Higher order thinking skills, problem solving, algorithmic thinking

# STEM

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## Computer Science

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## Computer Science is STEMulating!

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