COMPUTATIONAL

CORE

Computer Science in the Real World

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Have a Byte 2019

KANSAS STATE UNIVERSITY | Department of Computer Science

The Problem

How can we provide CS courses to a **rapidly growing** number of **non-CS** majors using **limited resources**?

The Problem

How can we teach
Computer Science
effectively
in an **online format?**

If you wish to make
an apple pie from scratch,
you must first invent the universe.

Carl Sagan

The Ideal Form of Education

Source: https://giphy.com/gifs/dreamworks-lets-do-this-kung-fu-panda-master-shifu-QxZ0nbcVgMIPlnfZos

A Scalability Problem

Computer Scientists like those!

Source: https://giphy.com/gifs/the-simpsons-class-dont-care-W1VdPHo8Ft3Es

The Traditional Approach

Few Students — More Students

- Small Lessons
- Instant Feedback
- Customized Curricula
- Develop & Engage
- Individual Skills

- Large Classes
- Turn In & Wait
- Published Textbooks
- Lecture & Grade
- Credit Hours

Online Learning?

Source: https://giphy.com/gifs/uviccampuslife-classroom-lecture-uvic-piZ2mYa0R9zzBpT9yb

Remote Teaching

Source: https://giphy.com/gifs/uviccampuslife-classroom-lecture-uvic-piZ2mYa0R9zzBpT9yb

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Online Pedagogy

- More, Shorter Videos
- Multimodal Content
- Asynchronous & Synchronous
- New Assessment Methods

Concerns

- Accessibility
- Time Management
  - External vs. Internal Motivation
- Feedback (Automated?)
- Mastery vs. Performance
- Assessing Learning Outcomes
- E-Textbooks vs. Custom
- Online vs. Installed IDE

Online Teaching Styles

- Traditional Face-to-Face
- Remote Teaching
- Fully Online Learning

All or nothing

Online Teaching Styles

- Traditional Face-to-Face
- Remote Teaching
- Fully Online Learning

All or nothing

- Flipped/Blended/Hybrid
- Hyflex
- MOOC?

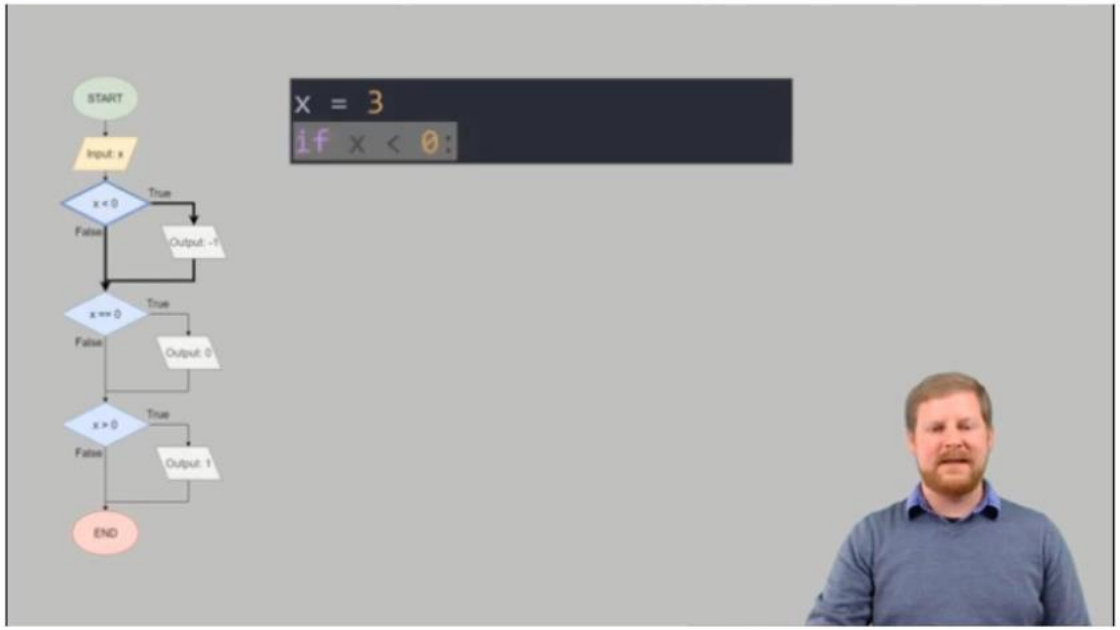
Best of both worlds

Conditionals....

```
1  x = 3
2
```


4.7.P.4. Chai...

4.7.P.4. Chaining and Nesting



One of the most powerful features of the conditional constructs we've covered so far in this course is the ability to chain them together or nest them within each other to achieve remarkably useful program structures. The ability to use conditional constructs effectively is one of the most powerful skills to develop as a programmer.

Zero, One, Negative One

A great example of the many ways to structure a program using conditional constructs is building a simple program that does three things:

- **4. Conditionals**
  - 4.1. Programs as Flowcharts
  - 4.2. Conditional Constructs
  - 4.3. If-Then Statements
  - 4.4. If-Then-Else Statements
  - 4.5. Other Conditionals
  - 4.6. A Little Review
  - **4.7.P. Python**
    - 4.7.P.1. If-Then
    - 4.7.P.2. If-Then-Else
    - 4.7.P.3. Variable Scope
    - 4.7.P.4. Chaining and Nesting
    - 4.7.P.5. Switch Statements
    - 4.7.P.6. Ternary Conditional Operator
    - 4.7.P.7. Handling Input
    - 4.7.P.8. Conditionals Subgoals
    - 4.7.P.9. A Worked Example
    - 4.7.P.10. Conditionals Exercise
  - 4.8. Conditionals Summary

Small Lessons

Instant Feedback

4.7.P.7. Input Test

Complete `Conditionals.py` following the program specifications given above. Click the button below to test your code and see if the program works correctly.

This assessment is worth 10 points in this module.

Check It! Show diff

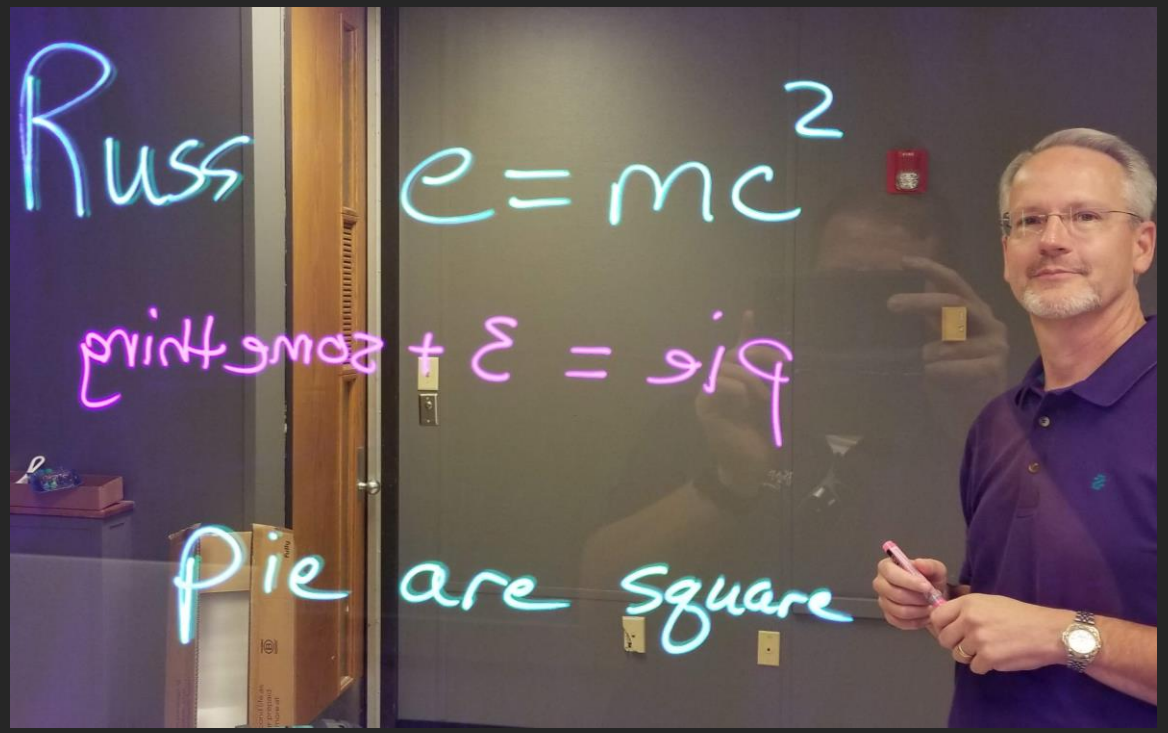
LAST RUN on 9/16/2019, 2:46:10 PM

Check 1 passed

Check 2 failed

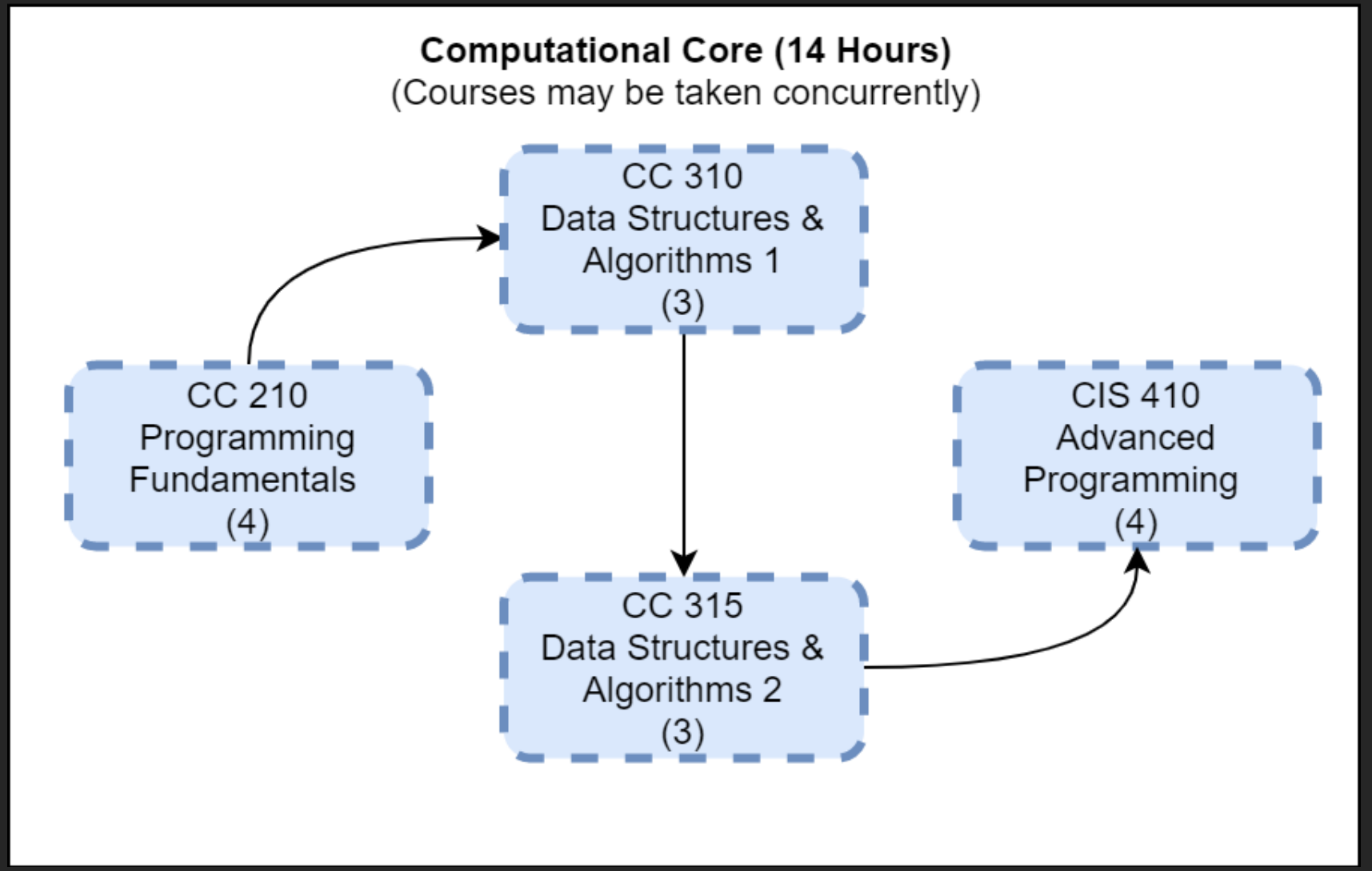
```
Output:
1.0.
1.5
Expected:
1.0
1.5
```

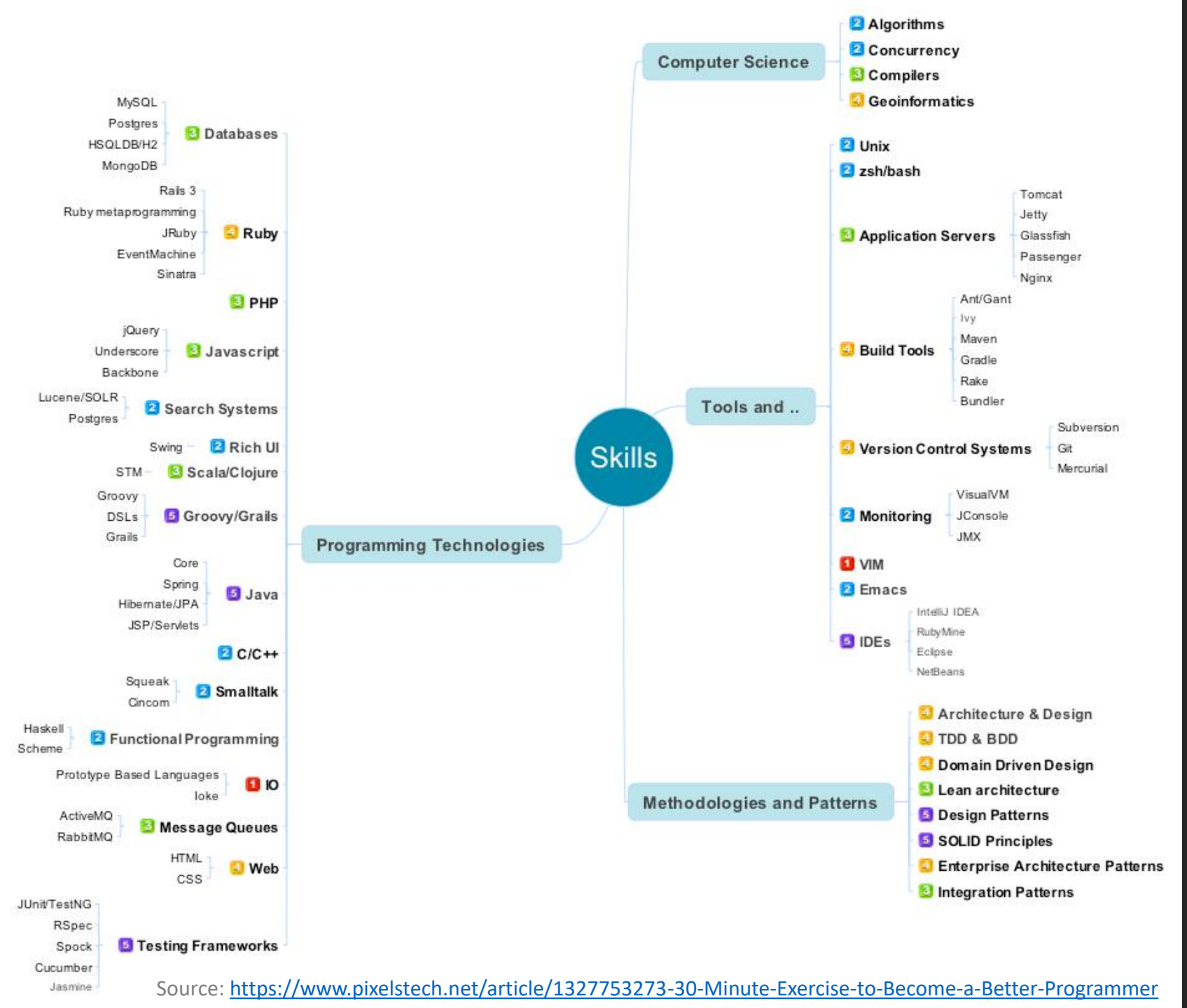
Check 3 passed



Develop & Engage

Customized Curricula

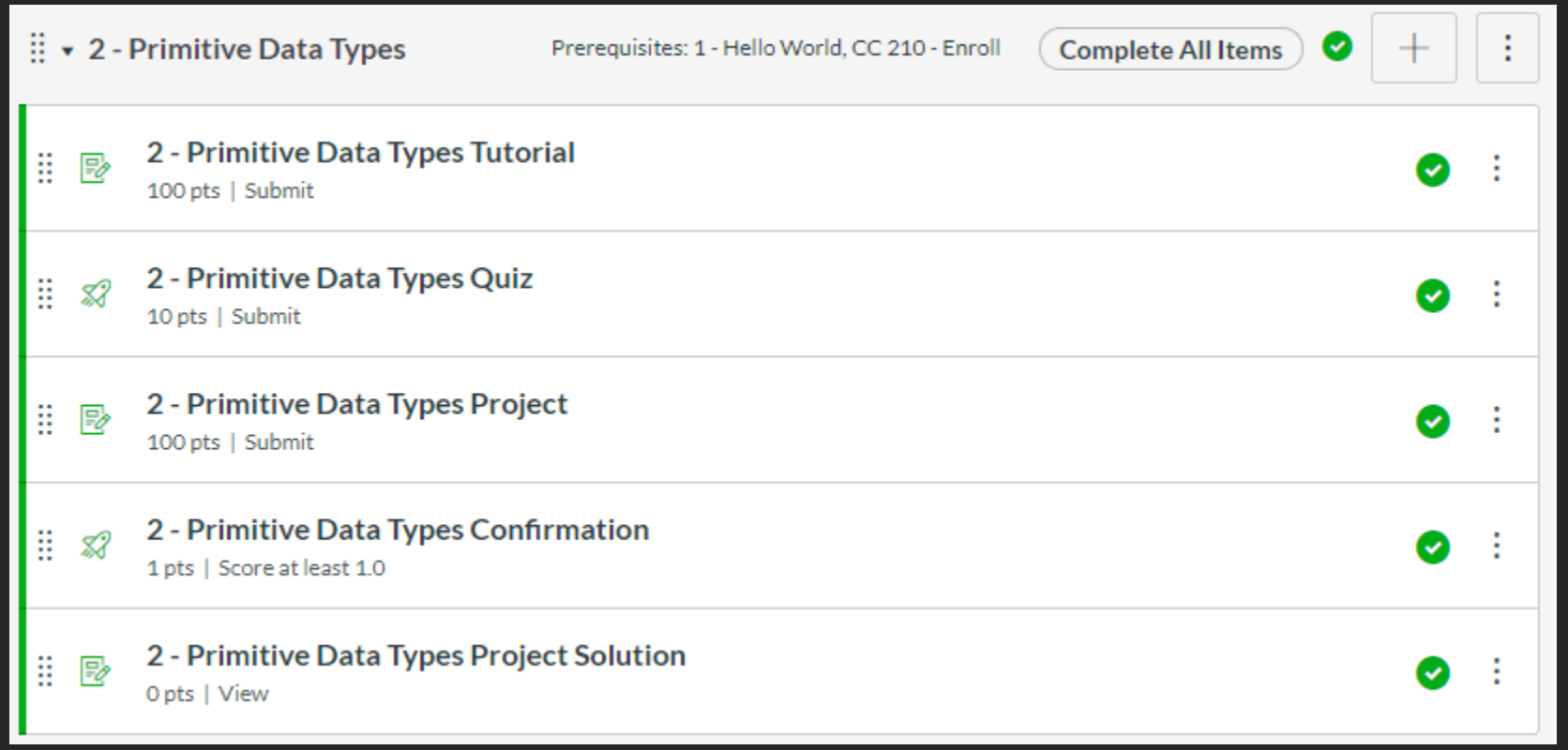




Source: https://www.pixelstech.net/article/1327753273-30-Minute-Exercise-to-Become-a-Better-Programmer

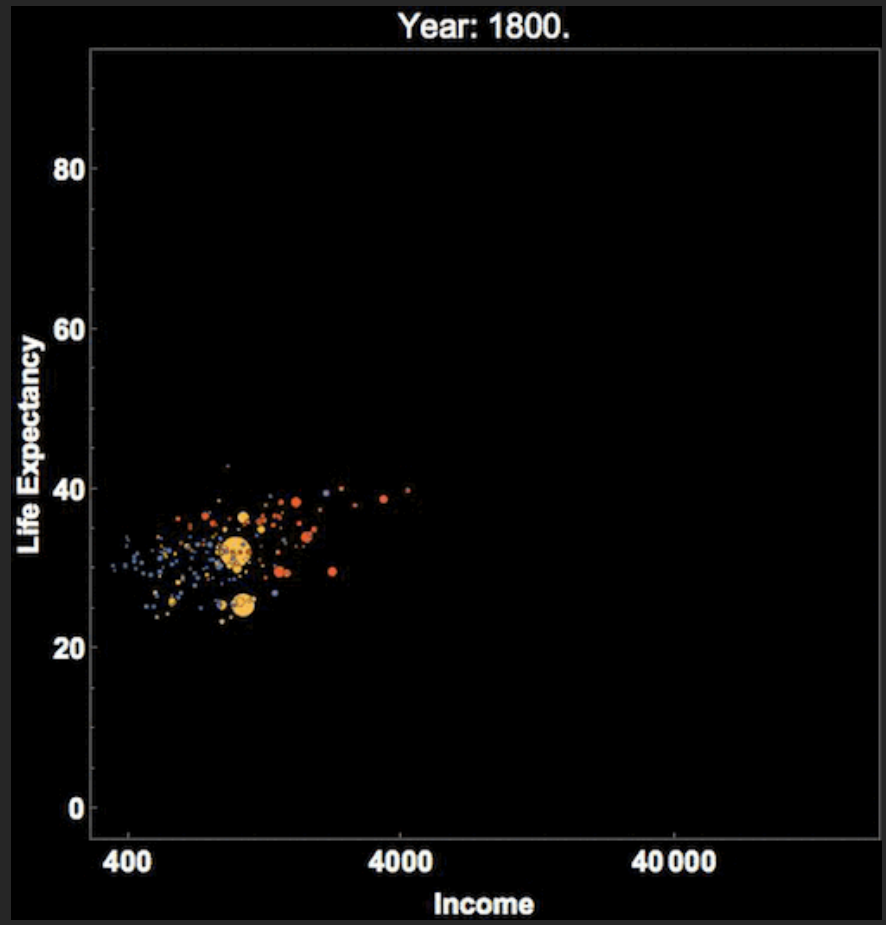
Individual Skills

… using Modules & Prerequisites



Certificate Capstone Project

- Identify Solvable Real World Problem
- Select Data Structures & Algorithms
- Implement Software to Specification
- Debug & Test



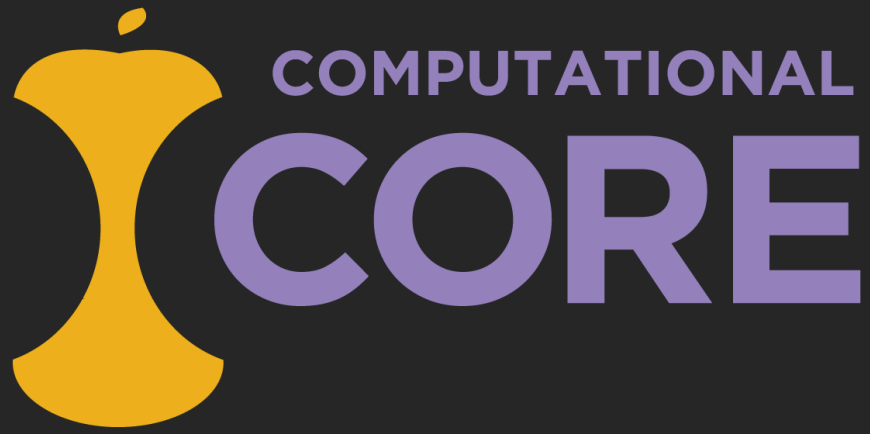
Source: https://giphy.com/gifs/wolfram-research-data-visualization-3o6Ygfw40tlnPhX87m

Available Today!

Computer Science Undergraduate Certificate

- 4 Courses, 14 Credits (5 courses, 17 Credits in Fall 2020)
- Any K-State Student
- Java or Python
- 100% Online
- Designed for Non-CS Majors

FREE TRIAL!



Possible Future Plans*

- Applied Computer Science Degree (with Arts & Sciences)
- High School Programs
- Teacher Training Programs
- Industry Certifications
- Additional Programming Languages
- Upper Level CS Courses
- Cross-Discipline Capstone Projects
- …and more!

**Subject to change – nothing is set in stone yet*

Russell Feldhausen

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russfeld.me/talks/haveabyte2019

CS Certificate Promo Video

bit.ly/ksucs-cert-promo

More Information

global.k-state.edu/engineering/computer-science

cs.k-state.edu/core

Thank You!

CC 210 Free Trial!

Must be current K-State Student, Faculty, or Staff