

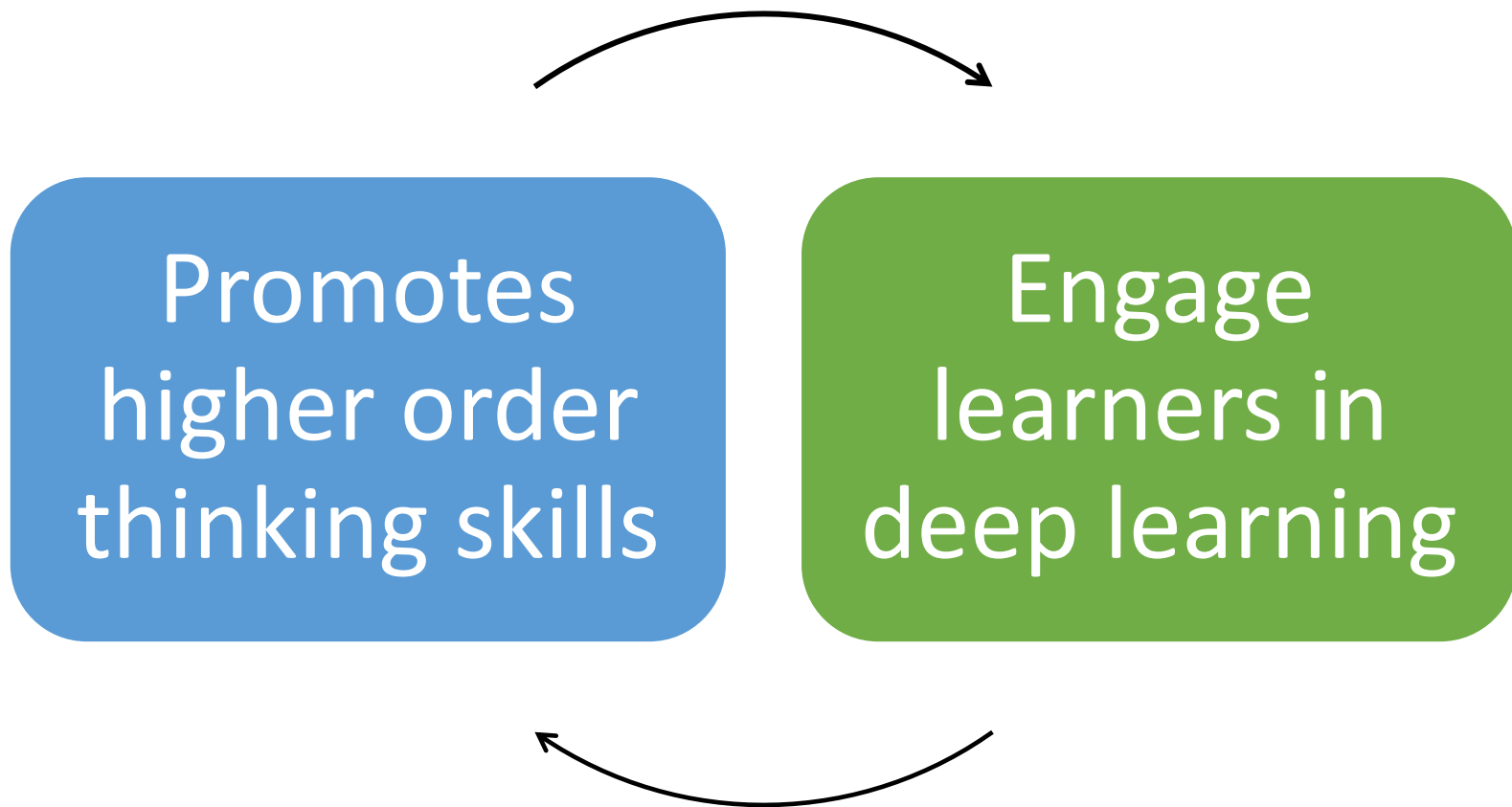


Active Learning: Learning to Program and Learning to Play the Piano



Presented by
Gene Shuman, Irina Hashmi, Department of Information
Sciences and Technology
Katrina Johnson, Stearns Center

Active Learning



Active Learning in Programming Classes

1 Get involved and increase motivation

2 Promote problem solving skill through real-life applications

3 Perform varied assessments

4 Help learners to review materials

5 Prepare for a major/final assignment

6 Explore the relevance of learning in learner's professional life

Software – Mysterious and Necessary

- A concept unknown before ~1970
- A vital part of modern **infrastructure**



Software: Mysterious...and Hard to Do



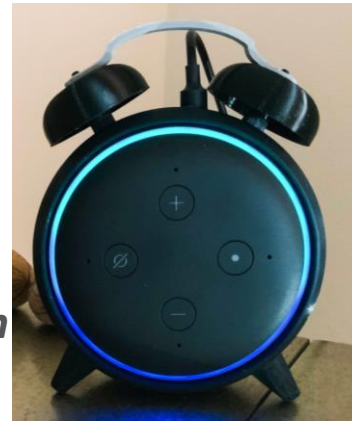
- Provides the “brain”
- A Mystery - invisible
- Very difficult in terms of design, time and expense

Learning to create software systems starts with learning to program, which is not unlike learning to play a musical instrument

Software Applications: Morning Routine



→
*Alexa, set up
alarm 7:30am*



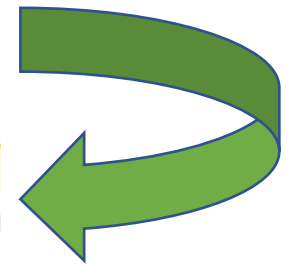
*Alexa, turn on
my coffee maker*



Hey google, take me to work



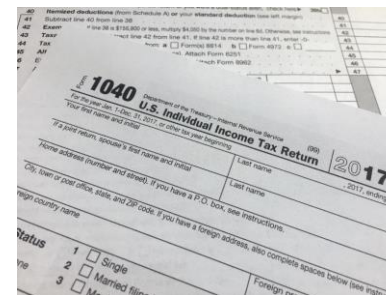
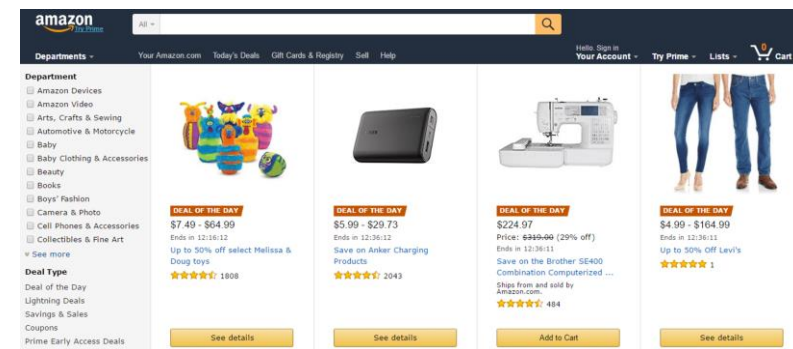
Alexa, what's the weather



Things Controlled by Software – 1970



Things Controlled by Software - Now



IT Majors and Programming

- We teach all IT majors how to program as part of a well-rounded IT education, even though most IT jobs are not “programming”
- All first year medical students take “Anatomy 1”



Learning to Program

- IT programming courses require students to write 15 – 20 programs during each of the required two course sequence
- Why so much? It's like learning to play the piano ...
- ...students need to learn music theory and about the keyboard



Learning to Program

- But you also have to practice by playing... *a lot*



- So you can one day do this...



Becoming an Expert

- Getting good requires writing a lot of programs
- Doing it well involves a certain amount of deep concentration – being “in the zone” in which one’s sense of time diminishes
- It’s not unlike jazz musicians, especially those who improvise during a performance...



- We’ve tried to explain this using....a cartoon (Who doesn’t love those?)



Dr. Gene Shuman
Assistant Professor
Information Sciences and Technology
Volgenau School of Engineering
IT 109: Intro to Programming



Learning to Program: A Piano Analogy

Play Animation 

Resources

- **Vyond** - <https://www.vyond.com>
- **Animation** - Dr. Gene Shuman's [Learning to Program: A Piano Analogy](#) (2:03 minutes)
- <https://marketbusinessnews.com/financial-glossary/infrastructure-definition-means/>
- <https://tenor.com/view/donald-duck-sleepy-bed-tired-good-night-gif-4614418>
- <https://www.etsy.com/listing/656711058/amazon-echo-dot-gen-3-alarm-clock-stand>
- <https://www.techradar.com/news/the-first-alexa-coffee-maker-lets-you-brew-hands-free>
- <https://www.howtogeek.com/319486/how-to-get-more-detailed-weather-info-from-alexa/>
- [A Brief History of Cloud Computing | IBM](#)
- [music note on brown piano photo – Free Music Image on Unsplash \(@lorenzospoleti\)](#)
- [Child performer Emily Bear appearing in Clinton Oct. 19 \(middletownpress.com\)](#)
- [BMI Mourns the Loss of Jazz Pianist Cecil Taylor | News | BMI.com](#)

End of the Learning to Program and Learning the Piano



Questions or Comments?