Flipped Class: Intro to Programming with Swift for iOS Development

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Who is this guy?

- **IS Textbook**

- **Flipped Class Courseware**
  - *Learn to Program with Swift for iOS Development - FlatWorld*

- **Founded/Led TechTrek Field Studies**
  - SF/Valley
  - Seattle
  - NYC
  - Ghana
  - Boston

- **Worked Closely w/Student Entrepreneurs**

New Dept. Member
v. 7.0 of Low-cost, Annually Updated IS Textbook

• **Firms Students Love to Study:**
  - Airbnb, Amazon, Disney (Magic Band), Facebook, Google, Netflix, Rent the Runway, Uber, Zara

• All **Concepts Demonstrated** through **Relatable Examples**
  - **Managerial:** Strategy, Accounting/Finance, Marketing, Analytics, Legal
  - **Technical:** Ranging from Collaborative Filtering to the Cloud, from Social Media to the Sharing Economy, Moore’s Law to Machine Learning.

• **A Style Students Enjoy**
  - Works for **undergrads** and **grads**

• Framing Question:
  “How can I possibly compete when everyone can copy my technology & the competition is a click away?”
Updates in v.7

• Videos for Day-1 Discussions:
  • AI Advances & Concerns
  • Disruption by 3D printing

• Netflix
  • Disney competition, Original Content, Global expansion, Infrastructure Update. Links to technical blogs.

• Moore’s Law & More
  • Internet of things in me
  • eWaste changes

• Disruptive Innovation
  • Updated "Bitcoin & Blockchain" section. Blockchain in action. Fragmentation / Bitcoin Cash. "Tastes like Blockchain"

• Amazon
  • Shift away from profit uncertainty to profit source. $1.7B ad biz, AmazonBusiness at 1 million customers.
  • New Section: The Lord of Logistics: Selling Shipping, Ring and Amazon Key In-Car.
  • Whole Foods update, Amazon Go launch. Alexa platform. Cloud success.

• Social Media & Peer Production
  • Tik Tok, Musically, Fortnite.
  • Twitter: tackling trolls & battling bots. Ad success & new offerings (bespoke emojis).
  • Blockchain for better prediction markets. Walmart hires from contests on Google’s Kaggle
  • Capturing bad service: Airlines, Uber’s Kalanick

• Sharing Economy, Collab. Consumption, Marketplaces
  • Share Everything? The Myth of the Market for Your Neighbor’s Power Drill
  • Uber updates: From Rebel to Revulsion: When Uber Behavior Became Hostile and Required Big Change. Softbank discount, Lyft competition. UberHealth API.

• Facebook
  • Dating Feature. Stories as a platform.
  • Learning from the Cambridge Analytica Scandal: Errant Apps, Privacy Protection and the Challenges of Running a Platform.
  • Challenges, missteps, current status of tackling fake news
  • The Admirable Goals and Unintended Consequences of Internet.org
Updates in v.7

• Rent the Runway
  • **Subscriptions now bigger than rentals.** CEO on board of Estee Lauder. 90% of new’17 customers via **word-of-mouth**
• Understanding Software
  • Refreshed "writing software" mention R, *Kotlin*, state of Java, IDEs. Want to learn more?
  • New Section: Software Development Methodologies: From **Waning Waterfall to Ascending Agile**, plus a **Sprint through Scrum**
• Software in Flux
  • Newer firms leveraging OSS: *Hortonworks*, *Cloudera*, and *MapR* & ascendant (*MongoDB*, *Docker*)
  • New Callout: **Clouds in Action**: A Snapshot of Diverse Efforts. Includes Cloudera / Thomson Reuters fighting fake news & Google / Airbus improving the interpretation satellite images.
• The Data Asset and Competitive Advantage: **Databases, Analytics, AI and Machine Learning**
  • Refreshed examples from **Airbnb & Spotify**
  • New Subsection: **Artificial Intelligence, Big Data and Machine Learning**: It’s Now Everywhere! Tech explained, Examples of AI in action, It’s **not as easy as the press might state**
  • New Callout: **Own an Apple product?** You’re Already Using a Whole Lot of AI
  • New Callout: **Catching the Golden State Killer**: The Promise & Peril of Big Data’s Reach
• Updated information on **Walmart’s Data Cafe**, current infrastructure stats, and emphasis on e-commerce work (acquisitions: **Jet.com Bonobos**, and ShoeBuy, **Flipkart** for Indian market).
Updates in v.7

- A Manager's Guide to Telecommunications
  - Updates on technologies: wireless emphasizes 5G. Firm updates: O3b, CSquared (Project Link), OneWeb, SpaceX.
  - Refresh on net neutrality
- Security
  - Leads with Equifax case
  - Refresh stats on cybercrime and impact, crime marketplaces, new examples: Atlanta ransomware for bitcoin mining.
  - Cyberwarefare and propaganda - influencing the electorate.
- Google / Alphabet
  - AI-First firm
  - Stats on cap. ex. Refresh on search/indexing, What’s it take to run this thing?
  - New frontiers in search: image (lens) and voice. Update on EU fines. Project Loon delivers to Hurricane-ravaged Puerto Rico
- YouTube Red, also issues with fake news, hate speech, Logan Paul "dead body broadcast"
New Videos (1/2)

- Smartest AI Companies
- Remote medical delivery by drone
- Is AI on Track to Achieve Superintelligence
- Printing Rocket Parts: Advances in 3D printing
- Has Guiyu finally shaken off the title of world’s e-waste capital?
- Daisy, Apple’s iPhone recycling robot
- How Blockchain Works
- Inside a Cryptocurrency ICO
- These are the Companies Amazon Owns
- Amazon is Conquering More than Kale
- Amazon Key In-Car delivery
- Amazon Books VP: Why we opened brick-and-mortar bookstores

- How does Amazon Go work?
- HomeKit in iOS 11
- Wiki at use: kiva.org
- Slack co-founder Stewart Butterfield - Future of Work
- How Auger Works (Prediction Market on Blockchain)
- Flight Attendants Suspended After Altercation With Passenger
- Softbank’s Uber stake purchased at a discount
- First look at UberAir
- Who is competing with Uber
• **Facebook** launches **dating** feature
• Facebook **data center tour**
• Cambridge Analytica Scandal Explained
• Zuckerberg’s **Congressional Testimony** in brief
• Everything You Need to Know About **How Facebook Targets You**
• How a Hard-Partying **Macedonian Teen Earns Thousands Publishing Lies**
• Facing Facts - An Inside Look at Facebook’s Fight Against Misinformation
• Interview with Rent the Runway CEO Jenn Hyman
• Inside the Rent the Runway Warehouse
• Scrum in Two Minutes

• How Machines Learn
• How Smart is Today’s AI?
• Walmart Flipkart Deal Valued at $16 Billion
• How Bots and Trolls Targeted the US Election
• How easily can your mobile phone be hacked?
• Could Your Smart Home Be Hacked?
• Sundar Pichai discussing meaning of AI-First (with examples)
• How Google Search Works
• Google Lens New Features Hands-On
• Google I/O in 10 mins
A New Approach to Teaching Programming
Motivation

• For students:

  • Biggest **Challenge to Student Innovators**: They Can’t Build Their Vision
  • Steep and long **learning curve**
  • Existing classes are **intimidating** (everyone gets it but me) and it’s hard to build a business in just **python**.

• For faulty:

  • Coding courses **require way to much prep & re-prep**

• **Could we bring students from no coding experience to confidently build a full-stack app in just one semester?**

• **Can we make it easier on faculty?** A **light-lift / high-impact** so they’ll want to teach this?
Learn to Program Using Swift for iOS Development

• Flipped Class - Lectures via video, Exercises in Class

• Traditional Approach vs. Swift for iOS Development
  • Student misses something & they’re lost vs. constant review
  • Chalk & talk vs. hands-on
  • Homework struggles vs. Skill-building challenges and classroom camaraderie
  • 1st courses are usually dull, text-based examples w/tired, unreliable standards like “programming fibonacci sequences” and “find the Prime number”. vs. App coding right away - students are proud to show off their homework.

• A Very Light Lifting Programming Course
  • No lecture prep
  • Class questions + answers prepped
  • Plus: slides + solutions I’ve used for in-class sessions, my own exams, and hints on how to make an excellent course into one of the best students will take (e.g. App Showcase, promote on social media)
More Motivating than Python, Java, or Visual Basic

Traditional Approach:

- Many intro courses use text-heavy languages like Python
- Classic courses rely on tired computer science staples that fail to excite students (e.g. find prime numbers, code Fibonacci sequences)
- Students usually aren’t building apps until several courses into their college career (3 at BC, CS1, CS2 come first)
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Flipped Approach:
- Students build visual apps from Day One
- Students learn programming skills and app development at the same time
- Fun examples that engage students and make them smile (Pokedex, Magic 8-ball, Help Elon Musk)
- Students get a fast track to internships, jobs, and entrepreneurship.
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“I've already been approached by a restaurant to create an app for them.”

“We learned valuable skills that apply to both Swift and programming as a whole. Interesting content.”

“Programming through a platform that is useful for entrepreneurship.”
Learn More through the Flipped Approach

Traditional Approach:

• Passive “chalk & talk” coding in lectures, disparate learners struggle to follow along at instructor’s pace.
• If a student misses a day, goes to the bathroom, or even sneezes, they might fall behind. Catching up with a book is tough. Scheduling a meeting with the professor is an inconvenient delay.
• Students are reluctant to have an instructor repeat content if they think most other people get it - increasing chances a student will fall behind.

Flipped Approach:

• Students can repeat videos as much as needed, and can speed up or slow down content.
• Roughly half of end-of-section exercises have solution videos, helping students ensure they’ve learned and not just repeated mouse-work and typing.
• In-class exercises provide an opportunity for students to apply video learning in a collaborative setting, offering support if they run into snags.
Learn More through the Flipped Approach

"Flipped classroom style allows you to go at your own pace."

"The reverse classroom system is great."

"I think is much more helpful than the hands-off approach that [other classes take] in homework assignments."

"I don't think such a mass of knowledge could be learned in such a short amount of time without the use of a flipped classroom style."

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Minimal Prep and Light Lifting for the Instructor

Traditional Approach:

• Faculty prep multiple lectures, with ever-changing technologies.

• Instructors fill much of class time with lecturing, being “on” constantly, and sometimes sidelined by uncooperative tech or unexpected bugs.

• New students demand a lot of instructor time when struggling with unfamiliar concepts.
Minimal Prep and Light Lifting for the Instructor

Flipped Approach:

- Professors have no lecture prep. All lectures are delivered via videos in the online book.
- Online quizzes at the end of each section verify learning, and point students to reference if they answered incorrectly.
- The text’s animations explain abstract concepts, like loops and indexing, better than chalk or slides.
- Class time is spent with students solving problems related to video projects they’ve completed during the week.
- Collaborative work is encouraged, with students learning from peers and learning more by explaining concepts.
- Slides + Solutions to all exercises are provided to faculty in advance.
- Students are less demanding of instructor time since they can review lessons and many exercise solutions online. Time in office hours is usually more focused and productive.
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"It was incredible to learn with Prof Gallaugher and feel the excitement of building apps that definitely motivated me to work much harder.."

"The professor is amazing, the reversed classroom style let me go at my pace, without always interrupting the class. I learned so much, in such a fun forum that I'm proud of how far I've come, even if I don't necessarily do well in the class."

Love Professor Gallaugher! He is very funny in the videos. He calls students "Swift-meisters" and "sultans of Swift" and similar funny names and has hilarious reactions when the app successfully builds or something interesting happens in general.

Our Approach:

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What Students Build:

**You Are Awesome!**
(encouraging phrases, pics, and sounds)

**Word Garden**
(like Hangman, but with a flower)

**Bip the Guy**
(“punch” images & photos, w/a satisfying spring animation & sound)

**To Do List**
(never forget a thing after building this app)
What Students Build:

**Convert It**
(English to Metric and Back)

**Weather Gift**
(add your own photos to match Local and worldwide weather)

**SWAPI**
(“punch” images & photos, w/a satisfying spring animation & sound)
What Students Build:

**Snacktacular**
restaurant recommendations to share with your friends)

- Google Sign-in
- Shared data with Google Cloud Firestore
- Map locations
- Star ratings & reviews
- Post & Share Photos
Other Ideas for Success

**TA Use:**

- Hire TAs that know more than me.
- More TAs than most classes.
- TAs attend class & hold published office hrs.
- Have them grade as much as is allowed
- Lavish Praise on TAs: Share info on team w/ contacts
Other Ideas for Success

Fun Tests & Examples:

- Harry Potter
- Star Wars
- Pokemon
- Programmer Compliments using the Chuck Norris API
- Tweet work you’re proud of? Get a laptop sticker!
Other Ideas for Success

App Showcase:
• Invite Campus, Friends
• Invite Alums & Employers
• Have Pizza
• Give-away SWAG & Multiple Awards
• Film & Share Presentations & Contact Info
• Invite Student Paper / Press

Product Overview: https://youtu.be/x22pBxPmvQg
Other Ideas for Success

Running Class:

- GitHub for Classrooms.
- StackOverflow for Teams (haven’t tried it yet).
- Tests on laptops in class, 2 pg. notes
- Retakes at 70% maximum, no notes
Other Ideas for Success

Geek Culture on Campus:

• Hackathons
• Elevator Pitch Competition
• Venture Competition
• Field Study