Welcome to FinTech!
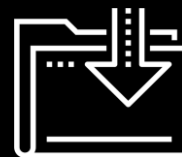
FinTech
Lesson 1.1

Class Objectives

By the end of today's class, you will:

- Get to know the instructional team as well as each other.

- Become familiar with the course format and requirements for certification.

- Review the course topics and agenda.

- Be able to explain what FinTech is.

- Review the completion and submission guidelines for the Unit 1 homework assignment.

Expectations

1. We are Professional hungry to learn new skills. "Stay hungry"!!!
2. Camera On and wear appropriate clothes
3. Mute your "mic" during class and turn it on when asking question. This eliminates unnecessary background noise. Feel free to have family members to know your classmates.
4. Attendance notification. See policy and notify both TA and Instructor
5. I encourage to actively participate, otherwise the computer will call your name randomly
6. Work on the activities during class because I will select a student randomly to present it with the group
7. Follow the HW policy.
8. Come prepare to office hours
9. Use the career services resources!!!!

*"There are naive questions, tedious questions, ill-phrased questions, questions put after inadequate self-criticism. But every question is a cry to understand the world. **There is no such thing as a dumb question.**"*

Defining FinTech

The Financial Sector Today

Why Big Banks Are Losing to Tech Giants Over Open Banking

How Technology Is Impacting the Finance and Banking Sector

Blockchain Technology Is Helping Small Businesses Create Their Legal Agreements

Worldwide Financial Services External and Internal IT Spending to Reach $500 Billion in 2021, According to IDC Financial Insights

The Future of Banking Is Rapidly Becoming a Digital Domain. How Will Community Banks Respond to the Tide of Technology?

Tech Firms Could Pose Major Threat to Banks

Banks Unveil Network to Digitize Trade Finance

Why Top Tech Talent May Be Coming to Finance

"Banks Are Technology Firms"

What Is FinTech?

The broader FinTech category can be segmented into four variants.

Origin			
	Technology	**Infrastructure providers** seeking to help financial institutions digitize and modernize their technology stacks. Examples: FNZ, Marqeta, Onfido	**Large technology ecosystems** using financial services to strengthen relationships with users. Examples: Apple, Ant Financial, Tencent
	Financial Services	**New entrants, start-ups, and attackers** seeking to enter financial services using new technologies. Examples: SoFi, TransferWise, LendingClub	**Incumbent financial institutions** making significant investments in technology to lift their game. Examples: Wells Fargo, Ping An
		Low (small scale)	High (large scale)
		Scale	

But what exactly *is* FinTech?

FinTech is the combination of finance and technology. More specifically, it describes a financial services industry that has been disrupted by technological innovation that competes with traditional financial methods and improves activities and inefficiencies in finance.

Activity: FinTech Group Discussion

In this activity, you will reflect on what FinTech means to you.

(Instructions sent via Slack.)

Suggested Time:
5 Minutes

Time's Up! Let's Review.

Course Overview

Curriculum Overview

Intro to FinTech
First, you'll learn about the fundamental priorities of investment banks, traders, insurance agencies, and other players in the financial industry. You will also learn about the command line and GitHub to prepare for future programming assignments.

Python and Financial Programming
Next, you'll learn Python programming, focusing in depth on the core libraries relevant to finance work. You will use APIs like Quandl to add live financial data feeds to your software projects. You'll also use a variety of analytic tools to extract insights and create reports.

Curriculum Overview

Algorithms, Statistics, and Machine Learning
You will learn a variety of core algorithms, models, and forecasting tools, including Monte Carlo simulations, risk-data aggregation, portfolio theory, and regression. You'll draw on this background as you apply machine learning concepts to financial challenges.

Advanced Topics: Big Data and Blockchain
The course will end with deep coverage of the big data and blockchain toolchains. You will use Python to complete challenges that involve building and using these toolchains for financial and regulatory benefit.

Curriculum Breakdown by Week

Unit 1: Intro to FinTech
1. Intro to FinTech and Finance

Units 2–7: Python for Finance Deep Dive
2. Python Basics
3. Python and Pandas + Review Day
4. Pandas + Review Day
5. APIs
6. Data Visualization
7. SQL

Units 8–9: Project Work
8. Project 1
9. Project 1 continued

Units 10–15: Applied Machine Learning
10. Time Series Analysis
11. Classification
12. Natural Language Processing
13. AWS and Cloud ML
14. Deep Learning and Robo Advisors
15. Algorithmic Trading

Units 16–17: Project Work
16. Project 2
17. Project 2 continued

Units 18–22: Blockchain Deep Dive
18. Intro to Blockchain
19. Interacting with Blockchains in Python
20. Intro to Solidity & Smart Contracts
21. Advanced Solidity & Smart Contracts
22. Blockchain Application Development

Units 23–24: Project Work
23. Project 3
24. Project 3 continued

Core Program Modules

Python

Applied ML and AI

Blockchain / Cryptocurrency

Analytic Value Escalator

Descriptive Analytics — What happened? — Information / Hindsight

Diagnostic Analytics — Why did it happen? — Insight

Predictive Analytics — What will happen?

Prescriptive Analytics — How can we make it happen? — Optimization / Foresight

VALUE

DIFFICULTY

Gartner
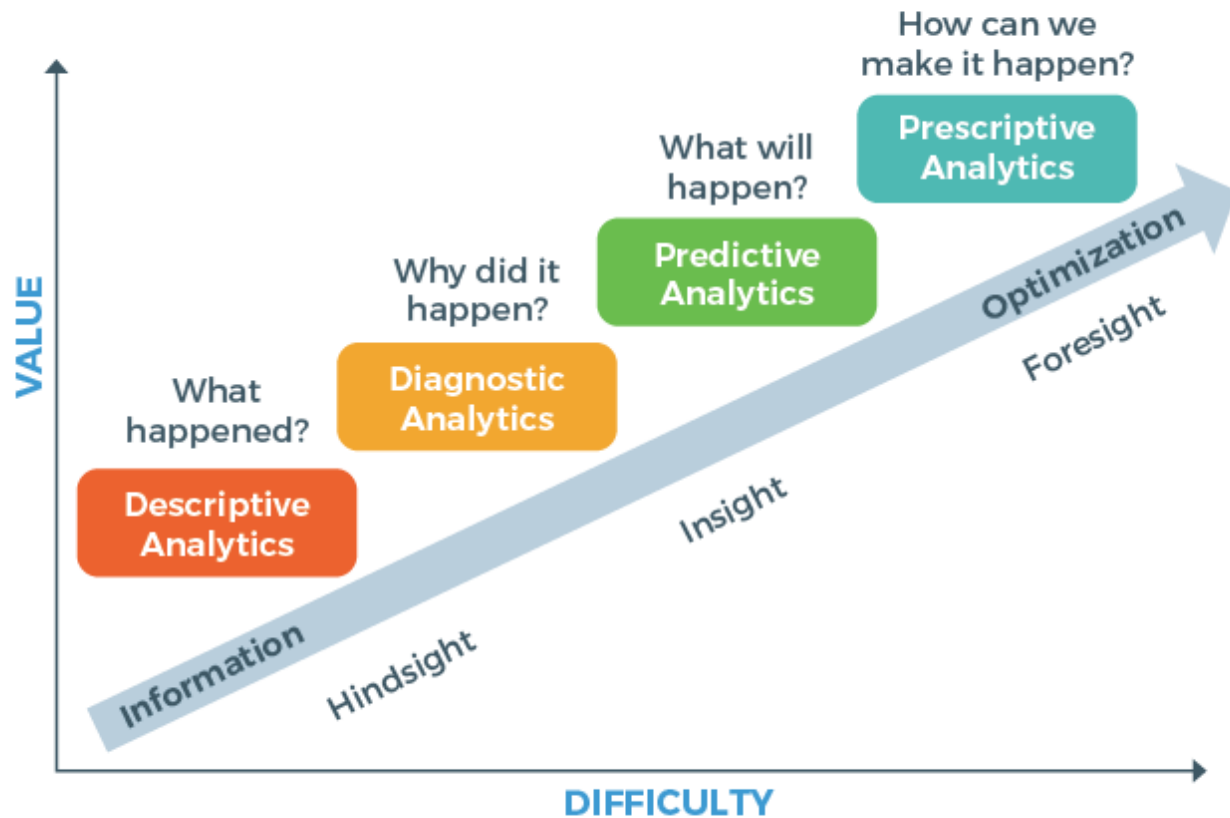
Curriculum at a Glance

Week 1: You will be introduced to the world of FinTech and discuss the current financial landscape.

Week 1

Weeks 2–7: You will learn the basics of Python and how to use additional libraries and tools such as Pandas, APIs, Plotly, and SQL databases, in the context of financial analysis.

Weeks 2–7

Weeks 8–9: You are tasked with your first project.

Weeks 8–9

Weeks 10–15: Companies are becoming more and more data-driven in their decision making. Therefore, through machine learning, you will need to learn how to not only interpret and create financial models, but also how to automate the execution of such models. Topics include algorithmic trading, robo-advisory, time series analysis, risk management, and Cloud ML technologies.

Weeks 10–15
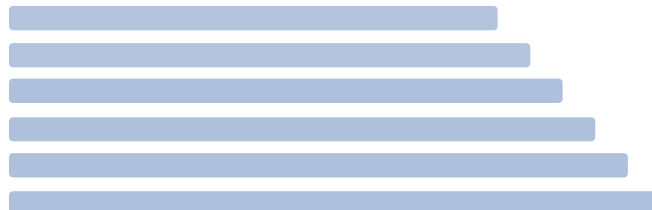
Weeks 16–17: You are tasked with your second project.

Weeks 16–17

Weeks 18–22: With its benefits of security, speed, and decentralized peer-to-peer validation, blockchain technology has already become more efficient than traditional finance in the context of transactions and third-party validation. You will learn blockchain fundamentals, smart contracts using Solidity, and how to develop blockchain applications on the popular Ethereum blockchain network.

Weeks 18–22

**Weeks 23–24:** You are tasked with your final project.

Weeks 23–24
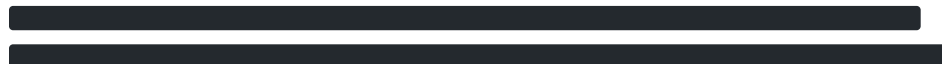
Hard Skills + Core Knowledge = *Real Jobs*

Skills/Technologies Covered

Time Series Analysis
Financial Ratios / Analysis
Python Programming
API Interactions
Pandas
NumPy / SciPy
Pyfin
Quant DSL
SQL
Monte Carlo Simulations
Forecasting
Modern Portfolio Theory
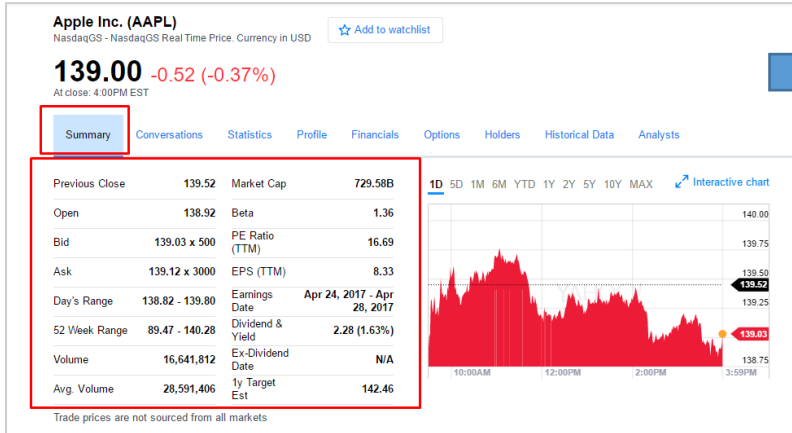Machine Learning
Big Data
Blockchain / Cryptocurrency
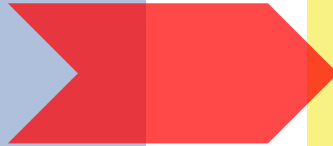
Relevant Jobs

Business Analyst
Financial Analyst
Data Analyst
Data Scientist
Quantitative Trader
Systems Business Analyst
FinTech Regulatory Associate
Software Developer
Financial Manager
Business Intelligence Analyst
Cryptocurrency Expert
Blockchain Developer

Sample Homework Assignments

Sample Assignment: Risky Business (APIs and Statistics)

You will learn to create *live* applications that draw stock data using the **financial APIs** to power **Jupyter** notebooks to analyze stock movement.
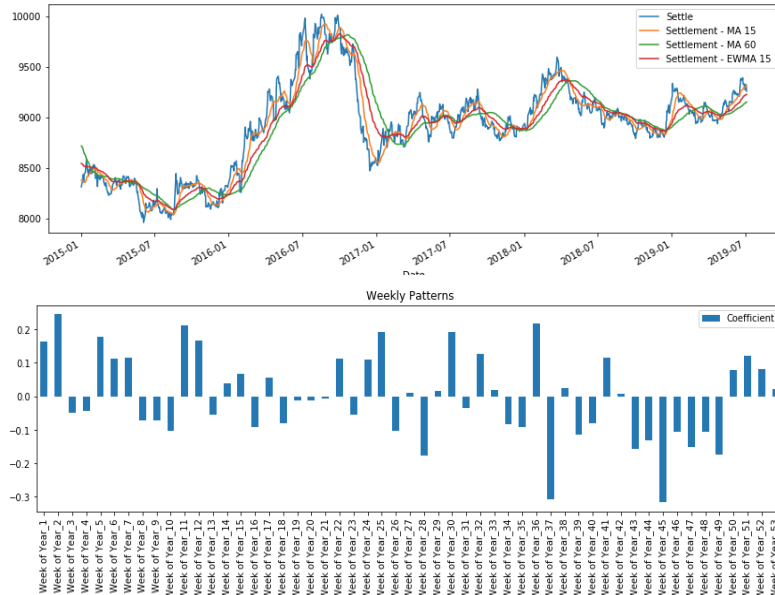
Sample Assignment: Stock Forecasting (Python & Time Series Analysis)

You will learn to create **predictive models** for stock prices using time series analysis and disparate variables.
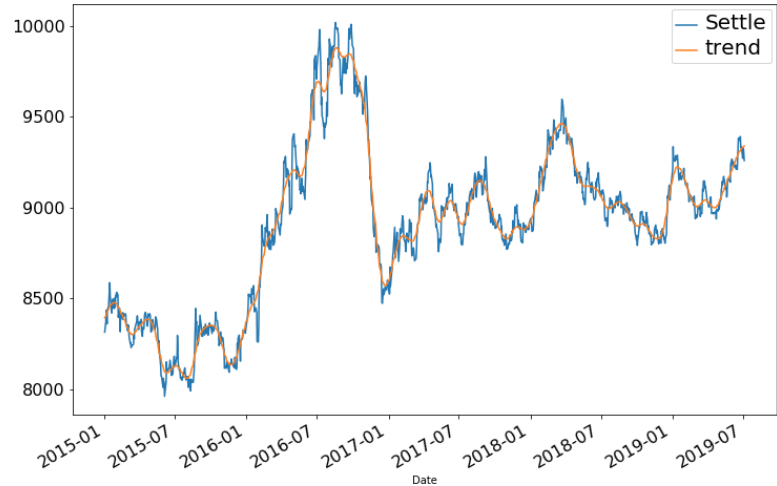
Return Forecasting: MA/EWMA Smoothing of Futures Prices

Return Forecasting: Decomposition Using a Hodrick-Prescott Filter

Sample Assignment: Crypto Sentiment (Machine Learning)

Throughout the course, you will learn the basics behind the most common **machine learning techniques** (linear regression, logistic regression, KNN, k-means clustering, etc.) and how to apply these algorithms to classic challenges in the financial services sector, e.g., applying natural language processing to analyze sentiment scores for cryptocurrency news.

	Compound	Negative	Neutral	Positive	text
0	0.0516	0.900	0.036	0.064	Cryptocurrency exchange Binance has resumed tr...
1	0.3818	0.943	0.000	0.057	Bitcoin is now trading at around $8,130, up a ...
2	-0.2263	0.888	0.065	0.047	Binance has vowed to raise the quality of its ...
3	0.3612	0.937	0.000	0.063	A new payment network called Flexa is launchin...
4	-0.6486	0.897	0.103	0.000	If you thought that the theft of 7,000 bitcoin...

Bitcoin NER

Cryptocurrency exchange Binance PERSON has resumed trading activity. Users can now cancel open orders, deposit crypto assets into their Binance GPE account, and of course buy and sell cryptocurrencies. You cant withdraw crypto assets to an external wallet just yet, but … [+1191 chars]Bitcoin is now trading at around $8,130 MONEY, up a whopping 60.84 percent PERCENT over the past month DATE, with the price surging $ 3,086.14 MONEY over the period.

The cryptocurrency's meteoric rise is reminiscent of its rocketing growth in the latter half of 2017 DATE, when prices reac… [+4311 chars]Binance has vowed to raise the quality of its security in the aftermath of a hack that saw thieves make off with over $40 million MONEY in Bitcoin GPE from the exchange.

The company — which is widely believed to operate the world's largest crypto exchange based on tra… [+2269 chars]A new payment network called Flexa ORG is launching today DATE that'll let you spend cryptocurrencies in physical stores. The technology currently supports bitcoin, ether, bitcoin cash, and the gemini dollar, and it'll work at retailers including GameStop ORG, Nordstrom NORP, … [+1743 chars]If you thought that the theft of 7,000 CARDINAL bitcoins from one of the world's biggest crypto exchanges would stop Bitcoin GPE 's price in its tracks, you were wrong.

On Thursday DATE, the price of Bitcoin GPE went above $ 6,000 MONEY for the first ORDINAL time since November last year DATE. At th… [+1729 chars]Quadric.io, a startup founded by some of the folks behind the once-secretive bitcoin mining operation 21E6," has raised $15 million MONEY in a Series A round that will fund the development of a supercomputer designed for autonomous systems.

The round was led by … [+3424 chars]A Europol PERSON -led police operation has arrested three CARDINAL people who allegedly ran the Wall Street Market, supposedly the world's second ORDINAL -largest "dark web" marketplace. Authorities also seized the site's servers and more than €550,000 MONEY (around $615,000 MONEY)

Tips

Embrace your inner toddler.

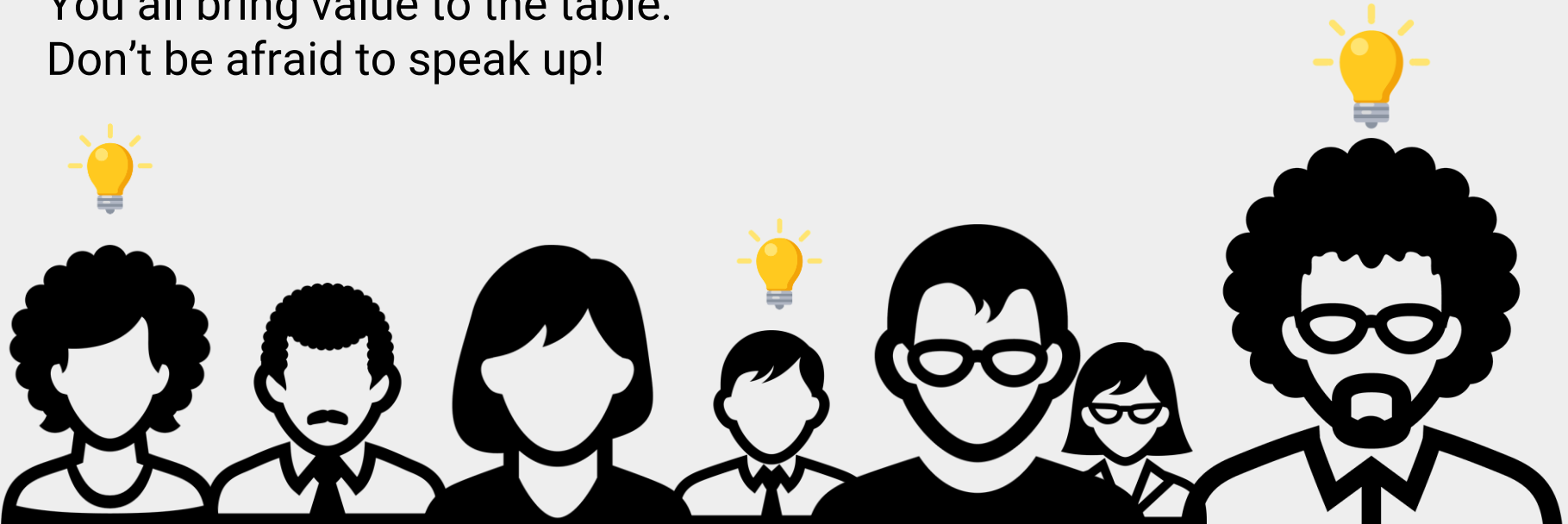Brace yourself for doubt, challenge, and confusion.

Relish the **novice experience** and expect a lot of **lightbulb moments.**

Form a community with your classmates.

You and your classmates are in this process together. Use each other for help!

You all bring value to the table. Don't be afraid to speak up!

There is no shortcut.
You've got to **put in the hours!**

Celebrate
your successes!

Personal Bullet list to succeed in the program

Troubleshooting Techniques – One step at the time

1. Read the problem instructions at least 2 times (everything)
2. Now read one more time but read between the lines and focus in the "ask"
3. Follow the instructions line by line, no skipping and no shortcuts
4. **Are you stuck? Did you get an error?** Read the error output and Check the activities in class
5. **Are you still stuck and can't solve the error?** Check again the activities in class and look for similar examples
6. **Are you still stuck and can't solve the error?** Use Google
7. **Are you still stuck and can't solve the error?** Ask your classmates in slack
8. **Are you still stuck and can't solve the error?** Go back to step 3 and repeat
9. **Are you still stuck and can't solve the error?** Reboot Computer, step out from your computer for more than 30 min and then come back and tackle the problem
10. **Are you still stuck and can't solve the error?** Come to office hours and TA/Instructor guidance

Bonus:
a. Attempt to do HWs after Lesson 2 of every week
b. Understand that there is a solution for everything, you just need to tell the computer the right way to do it.
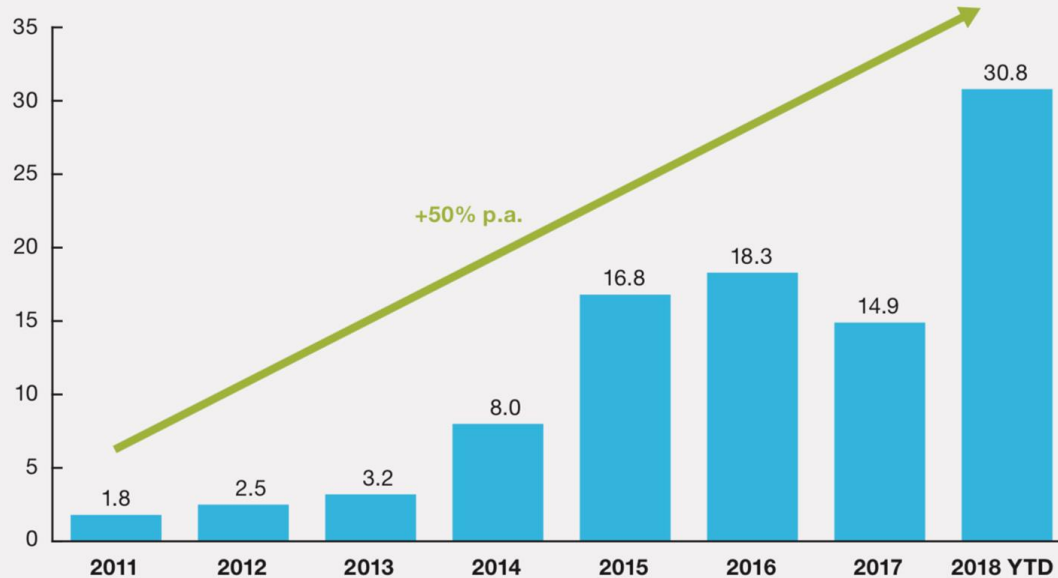
Countdown timer

15:00

(with alarm)

The Rise of FinTech

Global FinTech Investment Growth

FinTech investment has shown dramatic growth in recent years.

Global venture capital investment in fintechs
$ billion

+50% p.a.

Year	Value
2011	1.8
2012	2.5
2013	3.2
2014	8.0
2015	16.8
2016	18.3
2017	14.9
2018 YTD	30.8

Source: CB Insights; McKinsey analysis

Why is FinTech such a hot field of study these days?

The Driving Forces of FinTech

FinTech is driven by the same trends that dominate software and consumer technology.

Driving Technologies

Artificial Intelligence	**Blockchain**	**Mobile Technology**
Machine Learning	**Cryptocurrency**	**Cloud / Dev Ops**
Big Data	**IoT**	**IT Security**

The Driving Forces of FinTech

Target Industries

Regulation

Personal Finance

Corporate Finance

Corporate Accounting

Insurance

Investment Banking

Public Accounting

Artificial Intelligence

Blockchain

Mobile Technology

Machine Learning

Cryptocurrency

Cloud / Dev Ops

Big Data
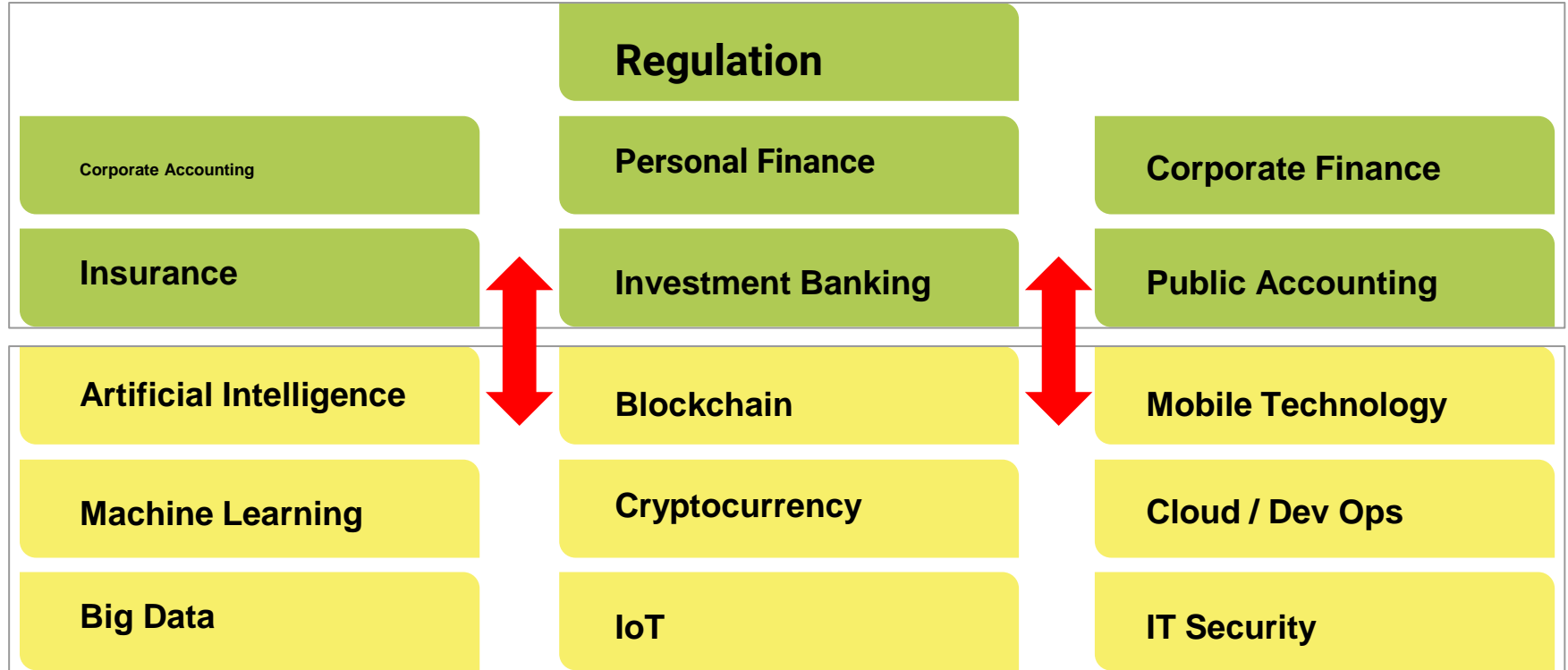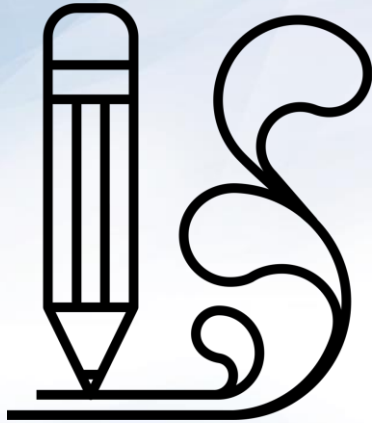
IoT

IT Security

Driving Technologies

Homework: FinTech Case Study

In this homework assignment, you will develop a case study for a particular FinTech company or technology.

(Instructions sent via Slack.)

Questions?