Microsoft Azure

Developing with Serverless Cloud Functions in Python

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Workshop Goal

What you'll learn :)

1. Get set up with Microsoft Azure
2. Learn about the Cloud and Serverless Computing
3. Write cloud functions that can read and write from a database and deploy it on Azure
4. Use this knowledge to quickly build an entire back-end for your next Hackathon

About Me

- Senior Computer Science major 🎓
- Lead back-end developer at Knight Hacks 💻
- National Park Lover 🌲
- Interested in making the world a better place with Machine Learning 🧠

Connect with me!

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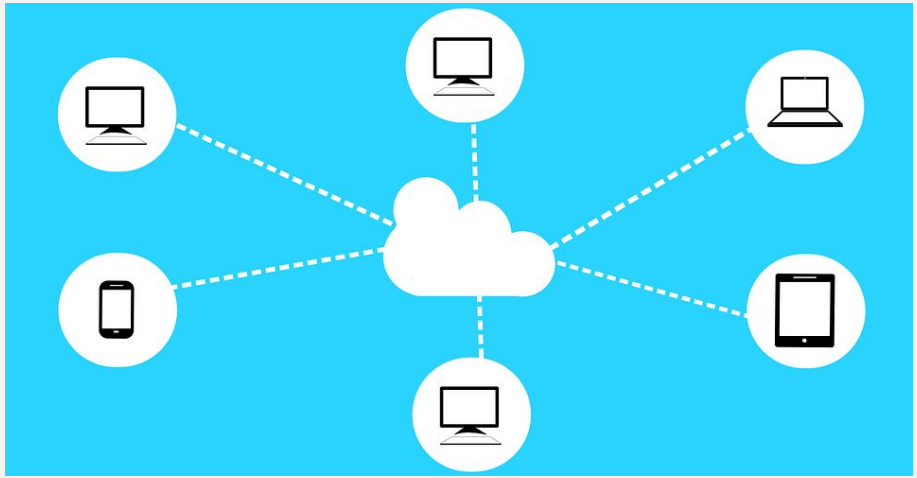
Agenda

1. Introduction to the Cloud
2. Setting up our Cloud Resources & Development Environment
3. Introduction to Serverless Cloud Functions & Cloud Databases
4. Setting up our Code
5. Test our Code

Cloud Computing (in general)

What is Cloud Computing?

“Cloud Computing” is the practice of using a remote server to manage and process data, rather than using your own computer



aws

Google Cloud Platform

Azure

Why do we need the Cloud?

Flexibility 🔧

Security 👮

Reliability 💪

Competitiveness 💥

Environmentally Friendly 🌱

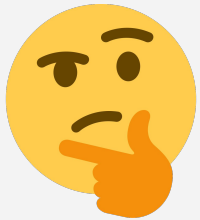
Why should you (as a student) use the Cloud?

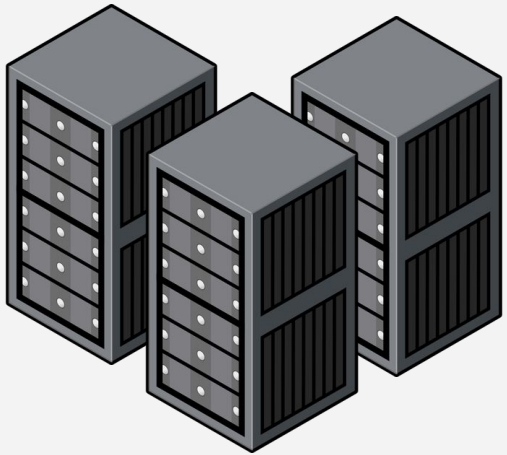
Great way to introduce functionality into your hackathon projects 🔨

Legitimate real world skills 🧠

Big tech companies love it 💘

Resume booster 😤





Setting up our Resources

Make an Azure for Students Starter Account

https://azure.microsoft.com/en-us/free/students/starter/

or search up “Azure Student Account”

Set up your Azure Resources

Make an Azure Resource Group

Make an Azure Functions App and put it inside the Resource Group

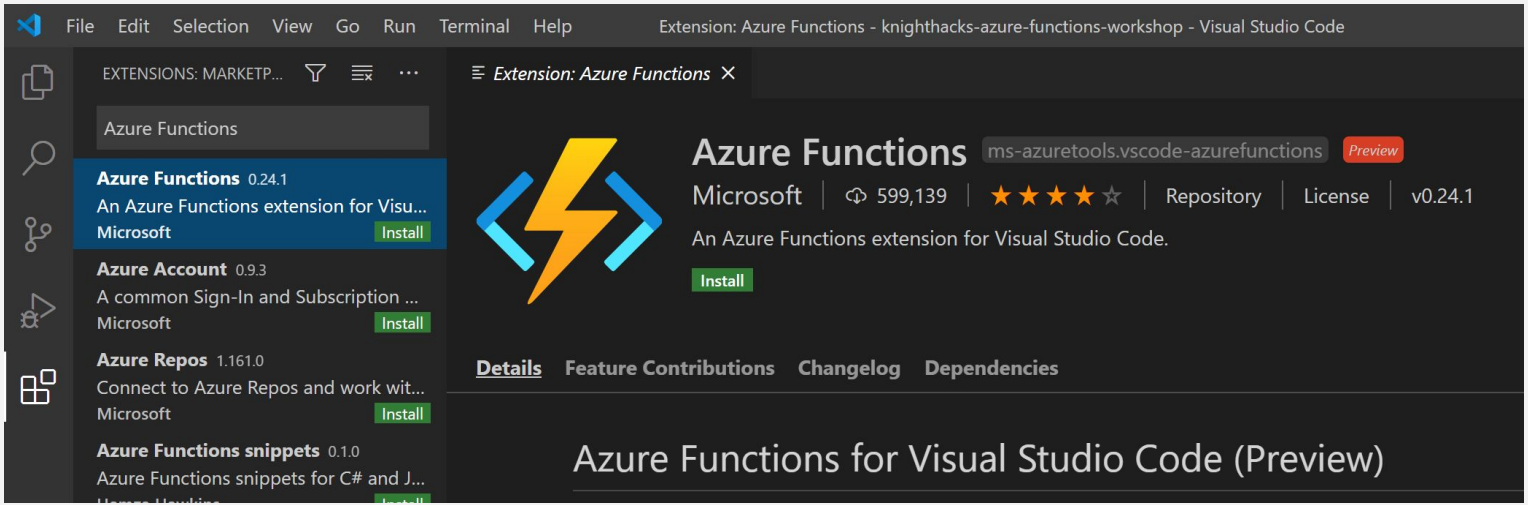
Make an Azure Cosmos DB and put it inside the Resource Group

Install Python 3.X

https://www.python.org/downloads/

Set up Visual Studio Code

1. Download Visual Studio Code (the text editor, not the IDE)
2. Install the Azure Functions extension inside of VSCode



Building our Backend

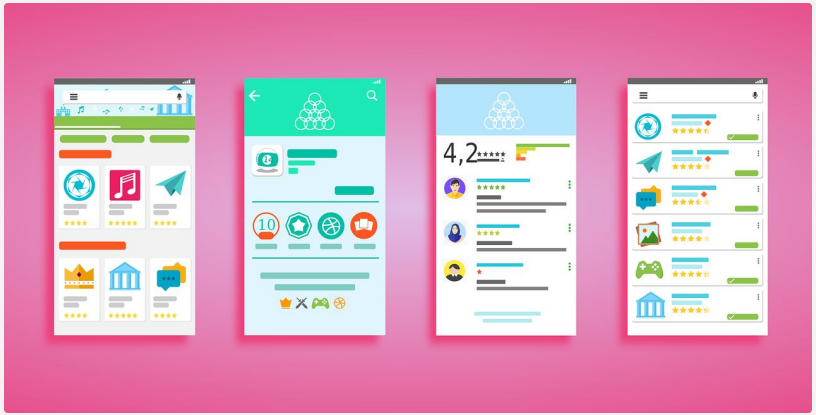
What is a backend and frontend anyways?

Back End

- Code you can’t see
- Handles logic and data manipulation

Front End

- Code you can see
- Makes things look pretty and functional



What is Azure CosmosDB?

Cloud-hosted NoSQL Database

- NoSQL refers to “non relational” databases that are *not* SQL, and stores data in many different structures

CosmosDB comes in a few different flavors

- Cassandra API - Tabular column format (excel spreadsheet style)
- Core API - SQL-ish format (use SQL queries on a collection of independent objects)
- Gremlin API - Graph format (each object in the database exists on a graph with edges)

What flavor are we using?

- Core SDK (The SQL-ish format)

What are Serverless Cloud Functions?

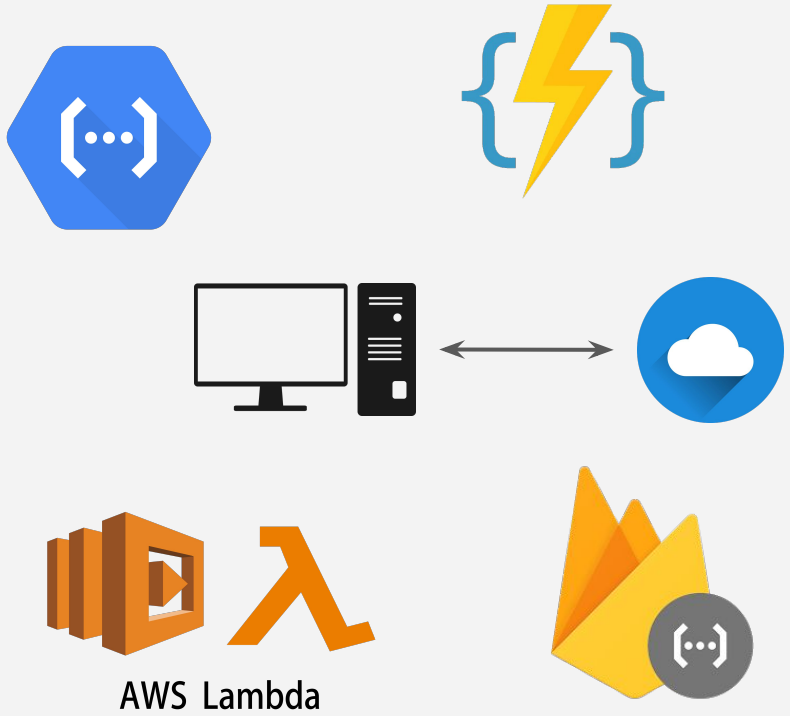
"Functions" refer to a snippet of code

```
int addTwoNumbers(int a, int b) {
     return a + b;
}
```

"Cloud" Functions refer to functions that exist on cloud servers

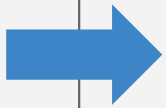
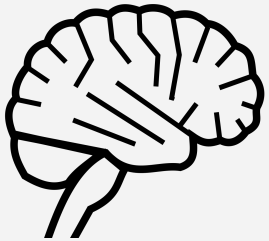
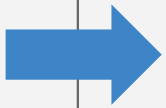
"Serverless" Cloud Functions refer to Cloud Functions whose cloud servers are fully managed by your cloud provider **

** Serverless refers to how *you* don't run the server, the company hosting it does



How are Cloud Functions designed?

Event Listener	Code Logic	Response
• **Web requests** • Automated timers • Database changes	• Do some math • **Update a database** • Ping some other API	• **Send a "We successfully did whatever you wanted us to do" response**


Why do Serverless Cloud Functions exist?

Eliminates code duplication

- You own an E-Commerce website that has a website and mobile client, and both apps need to share the same check-out functionality 🛒

Code that runs on a schedule

- You need to export the contents of your database once per week 📂

Code that needs to scale to meet high demand when you need it to

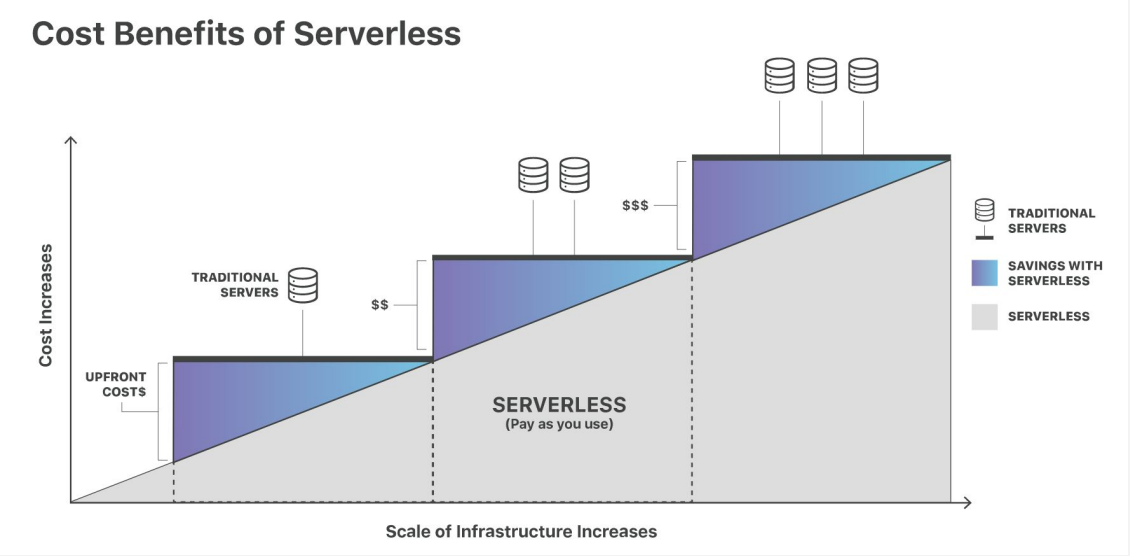
- You need to send emails to users in ‘waves’, with thousands of emails sent out at once 📧

Code that executes in response to an event

- You want to get notified whenever a new user signs up to your service 📱

Okay… but can’t I do that with regular code? What’s special about “Serverless” code?

- You only pay for as much “computing power” as you need at any given time on a function by function basis 💵
- Functions exist in their own bubble, so you don’t need to worry about cross-compatibility issues ❌

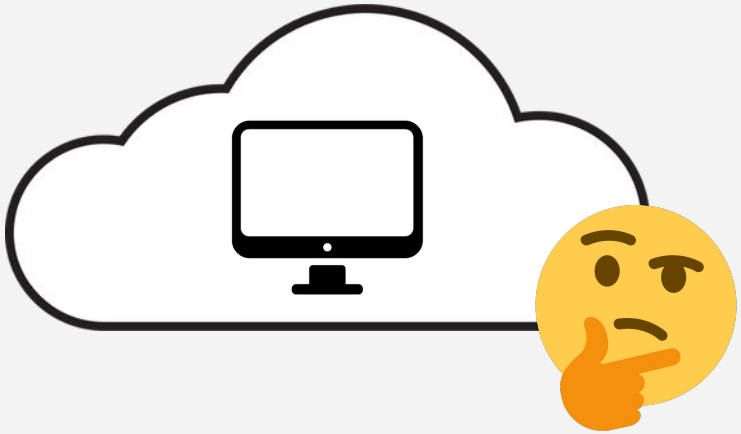


Why should you (as a student) use Serverless Cloud Functions?

(Relatively) super simple way to tie together projects 💻

Spend more time working on logic, not devops ⏱️

Rapid coding, testing, and deployment 🚄



What are we going to make?

Cloud Functions that…

Create, Read, Updates, and Deletes from our CosmosDB

A local Python script that...

Sends a web request to our Cloud Functions to see if they work

Code

github.com/jcbang/knighthacks-azure-functions-workshop

Questions?