National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	**Intro to Internet of Things**	**Course Code:**	**IO4041**
	Program:	**BS-CS, BS-SE**	**Semester:**	**Spring 2024**
	Section	**8A**	**Total Marks:**	**15**
	Due Date:	**17-5-2024**	**Weight**	**~3.3%**
	Exam Type:	**Assignment 3**	**Page(s):**	**1**

IoT integration with Azure Cloud

Prerequisite

Create a Microsoft Azure account and claim the free $100 student credit. If your Azure account is already setup, just proceed to next step.

Probably easiest way to get Azure credit is to first sign up for Github student developer pack using your LHR email address. And then sign up for Azure through it. See this video.

Task Instructions

Actual task and detailed instructions are explained in the two videos posted to google classroom.

Steps in brief

- (Azure) Create an IoT hub
- (Azure) Provision an IoT device
- (Local) Install python package azure-iot-device via pip
- (Local) Test sending a single message to hub
- (Azure) Create storage account
- (Azure) Add a storage container in this account
- (Azure) Create a stream analytics job.
- (Azure) Configure job's inputs and outputs.
- (Azure) Write the job's transformation query
- (both) Run the job, send IoT device data, and watch results in storage container.

Warning: Run the stream analytics job for as less time as possible. Stop the job when not in use, otherwise costs accumulate very quickly.

Tasks

1. Complete the virtual IoT device Python code to sequentially send all lat-lng coordinates from a route file.
2. Complete the stream analytics query to compute distance of each point to the destination (FAST campus).

UPDATE: for students without Azure edu subscription

1. Ignore the skeleton code, and write a Python script that reads the route json files and prints out an array of route points in the same format:

   ```
   [ {"lat": 31.5913166, "lng": 74.3062441}, ..... ]
   ```

2. Write the stream analytics query locally (it won't be testable). Provide the user-defined javascript function too, if used.

You also need to submit a screenshot showing that your Azure student application is pending.

To submit

- Completed python code
- Full query and the functions used if any
- Screenshot of storage container showing the output