Introduction to Device Programming for IoT: C Edition

Modality: On Demand

Duration: 12 Hours

About this course:

This course is part of the Microsoft Professional Program Certificate in IoT.

It is the most general of knowledge that the function of smart devices in our life is crucial. Not only this, constant advancement is being made in this field which has led to the coming up of a new device almost every other day. But is this question pondered over that a developer is required in the background in order to build all those devices? If this is the kind of aim you have, in which you want to turn all the imagined smart devices designs into a reality, this is just the right kind of course you would need. Taking this course will be your first step in programming for the Internet of Things.

In this course, you will get to know about the fundamental concepts of embedded device programming by incorporating various projects in Raspberry Pi and MXChip AZ3166 devices (the AZ3166 is Arduino-software compatible). You will also get to learn about coding a software that regulates the hardware (temperature sensors, photo cells, and more), as well as get an introduction on making a difference with the usage of procedural programming.

The course will start with an introduction on embedded programming, going over embedded device types and the inputs and outputs for devices and sensors. After this, you will traverse through a series of practical exercises comprising of lab projects. These lab projects will be about creating the hardware/software interface, and enabling you to understand C programming for embedded devices. The projects will also be about going over fundamental data regulation for a resource-constrained device. From this step, you will then go through embedded solutions that use your own circuit designs to resolve real life scenarios.

At the end of the course, when it will be completed, the students will gain the skill to create embedded device systems that have the feature of grabbing and process the data from the analog and digital form of sensors, that are generally found in the IoT solutions.

The course has been designed in such a way that it has the duration of 12 hours only. Furthermore, it has beginner difficulty level. This means that it will be a quick task to complete this course, both in terms of its difficulty level and time duration. It has self-paced learning style which means that you can complete it at your own ease and speed. Hence, this course is highly time-saving and productive as it provides refined skills in a short amount of time and with an easy syllabus.

NOTE: The lab project practical activities in this course is based on the hardware found in the Microsoft IoT Pack for Raspberry Pi and the MXChip IoT DevKit. It is, therefore, recommended that you purchase that before starting, in order to avail the lab projects in this course fully.

Learning objectives:

This course has the following learning objectives:

- Explaining the different features of an embedded device
- Setting up development environment for an embedded device type
- Developing a simple program that gains entrance to GPIO pins
- Incorporating the components of the C programming language in a constrained resource environment
- Setting up I/O libraries and obtain pinout readings
- Creating a simple embedded device application
- Describing the method of constructing simple circuits thorough the usage of common electrical items
- Explaining the sensor and device resources available in the market
- Installing the sensors within an application through the usage of SPI and I2C
- Describing the procedure of manufacturing a solution that uses more than one sensor
- Manufacturing the circuits for a solution
- Designing a software/hardware solution for a general situation

Audience:

This course is designed for and will be helpful for professionals like IoT engineers and IoT developers, in their workforce environment. The course will give these professionals an edge over other engineers and developers because of the polished and productive skills obtained from it.

Requirements:

The course has requirement that needs to be fulfilled prior to starting it. It is required because it will be very helpful for you during your learning. You must have some previous experience in programming. This is essential because you will be learning about developing and designing in this course. It is recommended, and not strongly required, that you have experience in C programming specifically, as this will be fruitful for you in your learning.

Course Outline:

Introduction Embedded Device Programming

- Preparing Your Dev Environment
- Developing Your First Application
- Module 1 Assessment

Data and Device Inputs

- Building a Binary Counter
- Getting Started with the MXChip AZ3166 Device
- Module 2 Assessment

Circuit Components and Sensor Hardware

- Building Simple Circuits

- Building a Temperature Gauge
- Module 3 Assessment

Real-World Solutions

- Building a Pho Cell Device
- Comparing Digital and Analog Inputs

Final Evaluation

- Final Assessments