Python Practitioner Series (Intermediate) - Internet of Things (IoT) Practitioner Workshop

Abstract

Oxford Dictionary defines Internet of Things (IoT) as “The interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data”. Simply put, it is about connected and embedded devices that communicate to achieve its purpose through Internet network. These devices can also be called “smart objects” if it is incorporated with enough artificial intelligence to act/perform. These IoTs can range from connected coffee makers, cars, or sensors on cattle to connected machines in a production plant, etc. A new forecast from International Data Corporation (IDC) estimates that there will be 41.6 billion connected IoT devices, or "things," generating 79.4 zettabytes (ZB) of data in 2025. The global market for Internet of things (IoT) end-user solutions reached 100 billion dollars in market revenue for the first time in 2017, and forecasted by statista.com that this figure will grow to around 1.6 trillion by 2025. This technology is contagious and will revolutionize consumer habits which impact the way we live, work and play.

Python is one of the world’s most popular programming languages. Python climbs from third place to second in the latest 2020 ranking of programming language popularity published by RedMonk.com. Another indicator of Python popularity is the Tiobe Index, in which Python clinches 3rd position after Java and C in Mar 2020.

Therefore, in this workshop, participants will have a golden opportunity to learn about Python programming and the latest IoT Technology. This workshop is designed to provide a complete IoT learning experience through integrating RPi device with sensors/actuators to IoT Cloud platform. The participants can apply what learnt in the workshop by designing/developing a Smart Home/Office System. In addition, Design Thinking technique is used to ensure a quality design stage for the Smart Home/Office System project. This is a complete practical hands-on IoT development workshop that is fun to learnt.

Learning Objectives

1. Module 1
    - To learn Internet Of Thing (IoT) Basic
    - To learn Raspberry Pi (RPi) Development Platform
2. Module 2
    - To learn IoT Device Python Programming
3. Module 3
    - To learn Open Source IoT Cloud Platform Integration
4. Module 4/5
    - To apply Design Thinking technique in project
    - To design/develop a Smart Home/Office IoT System

Target Audience

For anyone who has an interest in designing/developing IoT home/office smart applications. This is good for working adults who have minimum or zero knowledge/experience in IoT.

Prerequisite

Ideally, the participants should have worked in software/platform development field for a few years. Require them to have some basic knowledge in hardware circuitry/components and Python programming skill. This workshop will not teach basic Python programming skill and it is a pre-requisite for participants to learn before attending the workshop.

Training Setup/Methodology

This is a practical workshop training with many exercises to strengthen the understanding of IoT and its application for office/home design/development project. The workshop is designed in Modules. Basic workshop should consist of Module 1/2/3. Module 4/5 are real project implementation and are optional.

Duration

5 Modules per workshop. Each module spans 9am – 12:30pm & 1:30pm – 5pm (7Hours per module per day)
Expect a consecutive 5 working days of schedule. Customer can drop Module 4/5 (IoT Project) to keep the basic class in only 3 working days.

Content

1. Module 1 – IoT Fundamental & RPi Platform Introductory (1 Day)
   a) Introduction to Internet Of Things (IoT): Definition, Communication Model, Architecture, etc.
   b) Introduction to Raspberry Pi (RPi) Hardware: Hardware Architecture Block Diagram, GPIO Pins & Sensors/Actuators
   c) Introduction to RPi Programming: IDE, Raspbian OS & Python programming language:
   d) Sample Code Walk Through
2. Module 2 – IoT Device Programming (1 Day)
   a) Python Programming for Sensors/Actuators: Temp, Light, Pressure, etc.
   b) Python Programming for Communication/Networking: Wifi, Bluetooth, MQTT, Web, etc.
   c) Python Programming for GUI
3. Module 3 – IoT Cloud Integration (1 Day)
   a) Open Source IoT Cloud platform Setup/Configuration
   b) Open Source Mobile App and IoT Device Integration
4. Module 4/5 – IoT Project (2 Day)
   a) Design Thinking (DT) – DT Mindset & 5 Steps Methodology (Empathize->Define->Ideate->Prototype->Test)
   b) Code Challenge: Design/Develop a Smart Home/Office IoT System

   Hardware Requirement (estimated for a class of 20 learners only. Product/Price are extracted from cytron.io & seeedstudio.com on 12 Jul 2020)
   c) 20 sets x “Raspberry Pi 4 – 2GB (Rev1.2)” (RM174x20=RM3480)
   d) 20 sets x “GrovePi+ Baseboard” (RM159x20=RM3180)
   e) 5 sets x “GrovePi+ Starter Kit for Raspberry Pi” (RM539.90x5=RM2699.50)
   f) 20 sets x Universal-4-Pin-Buckled-30cm-Cable-5-PCs-Pack (USD2.99 x 20 = ~USD60 = ~RM300)
   g) Participants should use their own Laptop for doing programming with Raspberry Pi 4 (Module 1/2). It is a MUST requirement.
   h) Participants should use their smartphone for IoT Cloud Integration (Module 3). It is a MUST requirement.
   i) The virtual training room at participant location should be supported with quality WIFI connection. Participants can access Internet during the workshop session.

   Prework – RPi software installation/setup and RPi/Sensor/Cables Purchase

Trainer Biodata

Choo Fook Seng graduated from National University of Singapore (NUS) in 1990 with bachelor's degree of Electrical & Electronic Engineering. Later in 1996, he obtained Master of Science in Communication Software Management from University of Essex UK.

Fook Seng (born 1965) had over 20 years of proven track record in managing and delivering multi-million-dollar mobile phone (Motorola) and IA silicon/platform (Intel) software engineering projects. He demonstrated persuasive and influential skills in working together with various key stakeholders to deliver engineering projects on time and with quality. He is analytical, result oriented and customer oriented in resolving project/team problems. Fook Seng is proficient in driving organization continuous improvement initiatives by applying best practices of SEI CMM, ISO9001 and Agile SCRUM/LEAN to the organization design/development life cycle. The best accomplishment was achieving SEI CMM Level 4 certification for Motorola Singapore Design Center software team in 2001.

Fook Seng has a strong passion in employee training/coaching and has developed numerous courses to-date in the area of **Software Engineering Best Practices, Agile/Lean Project Management, Digital Transformation, Internet of Things with Arduino/RPi, Design Thinking, Maker Movement, 4th Industrial Transformation, Trust Leadership, AI Workshop, Python Data Science,** etc. During 2014-2009, he had contributed significantly to Intel Training/Development for Intel Malaysia employees:

1. Delivered 2 Intel University (IU) Training classes of **"Trust Matters"** for 30 Penang HR Payroll employees Sep'13 & 2 IU **"LEAN"** trainings for 12 Penang Embedded Engineering employees H1'13 plus many more informal **"LEAN"** training/coaching.
2. Invited to share Best Known Method (BKM) at 1st/2nd **"Bright Spot" manager sessions** for >100 Malaysia Design Center (MDC) managers starting Nov'13.
3. Completed 7 **Lean/Value Stream Mapping** (VSM) training/workshop sessions for Penang Embedded Software Engineering Teams 2012. Delivered 2 **"Myself as Trust Builder"** trainings (Apr/Sep'11) benefiting 46 Intel Malaysian employees. Picked up **T-Coaching** certification and delivered 2 new Manager coaching sessions H2'11.

In addition, Fook Seng had championed **People Development programs** 2006-2008 for Intel Board Design Center Malaysia (BDCM) team which benefiting 200+ employees by implementing Manager Feedback Tool workout, Mentorship Pilot Run, Innovation culture building & numerous soft skill/technical trainings.

His training/consultancy specialties are in the areas of software engineering best practices, embedded/web/PC programming, management & leadership soft skills and digital/4IR/Artificial Intelligence transformation. He has working experience and familiar with multiple languages like Pascal, C, C++, PHP, Javascript and NodeRed. In recent years, he focusses on Arduino Sketch, SCRATCH, & Python programming languages and has delivered multiple trainings in these languages

CERTIFICATIONS

- ❑ WIDE/IPv6 Forum Certified Network Engineer Level1/2 (2016)
- ❑ iNTACS Automotive SPICE/ISO 15504 Provisional Assessor Certification (2015-2021)
- ❑ Malaysia HRDF Trainer Certification (since 2014)
- ❑ ScrumAlliance.org Certified Scrum Master (since 2013)
- ❑ ScrumAlliance.org Certified Product Owner (since 2012)
- ❑ Intel/SSG Trainer of LEAN Overview (2012)
- ❑ Intel/SSG Trainer of LEAN Value Stream Mapping (VSM) (2012)
- ❑ Intel Trainer of Trust Matters (2012)
- ❑ Intel Certified 6 Sigma Green Belter (Jul 2012)
- ❑ Intel Certified Transition-Coach (2011)
- ❑ Intel Trainer of Building Trust (2008-2011) – Ken Blanchard Licensed Training
- ❑ Intel Certified Trainer of Outsourcing 101 (2007)
- ❑ Intel Certified Trainer of Code of Conduct (2007)
- ❑ Intel Trainer of Software Metric Overview (2004)
- ❑ Intel Trainer of CMMv1.2 Introduction (2004)
- ❑ Motorola Certified 6 Sigma Green Belter (Feb 2003)
- ❑ Motorola University's Certified Trainer for SEI Capability Maturity Model (CMM) Course (Mar 2002)
- ❑ Motorola Qualified SEI CMM Assessor (1999)
- ❑ Motorola Qualified Project Manager (1999)

Detail biodata is also available online via QR scan below: