Computer Science Core Project for 2016-2017:

IoT World

Project Sponsor:

The challenge: *to build and programme IoT solutions using Raspberry Pi technology, and to understand how these solutions are applied in industry*

Project launch (all day):

02/11/2016

Project workshops (mornings only):

06/12/2016, 26/01/2017, 27/02/2017, 31/03/2017

IoT Expo (all day):

03/04/2017

The Internet of Things Is Here

The Internet of Things (IoT) is increasing the connectedness of people and things on a scale that once was unimaginable. Connected devices outnumber the world's population by 1.5 to 1. The pace of IoT market adoption is accelerating because of:

- Growth in analytics and cloud computing
- Increasing interconnectivity of machines and personal smart devices
- The proliferation of applications connecting supply chains, partners, and customers

Why It Matters

Most businesses are focused on getting products to market more quickly, adapting to regulatory requirements, increasing efficiency, and most importantly-continuing to innovate. Your highly mobile workforce, customers, and supply chain demand anytime, anywhere business tools. An IoT platform can help.

Cisco IoT World challenge:

Project Launch Day: You will first undertake a PHP/HTML session. You will then receive a briefing from the Cisco team, and meet your Cisco mentors.

Workshops: You will receive instructions at the beginning of each workshop. In small teams, you will be tasked with building 4 x IoT solutions using Raspberry Pi kits, as models of technology used in industry today:

- RFID
- Beacon
- Computer Vision
- Barcode

You will be supported by Cisco mentors, and your team will be judged upon the following:
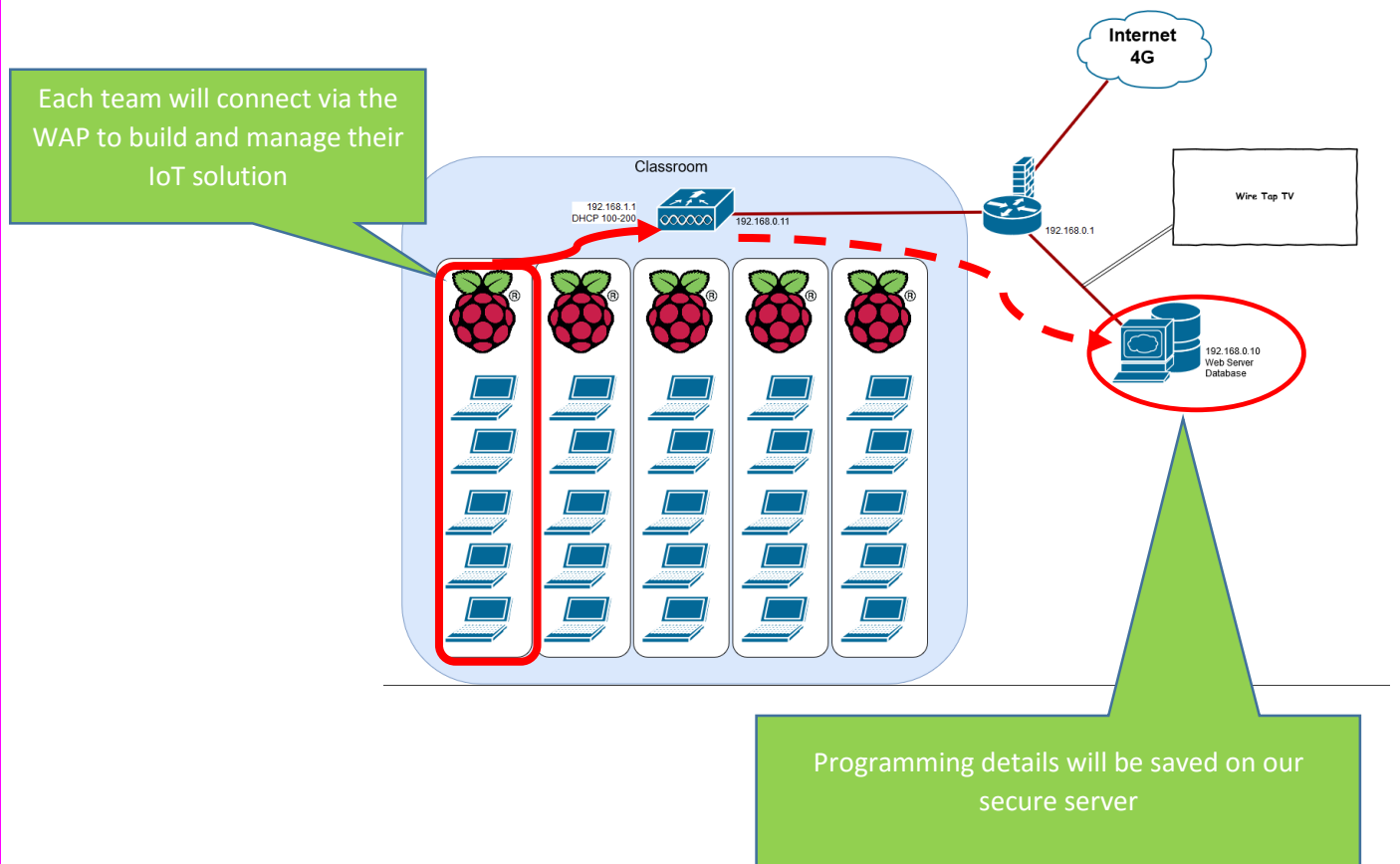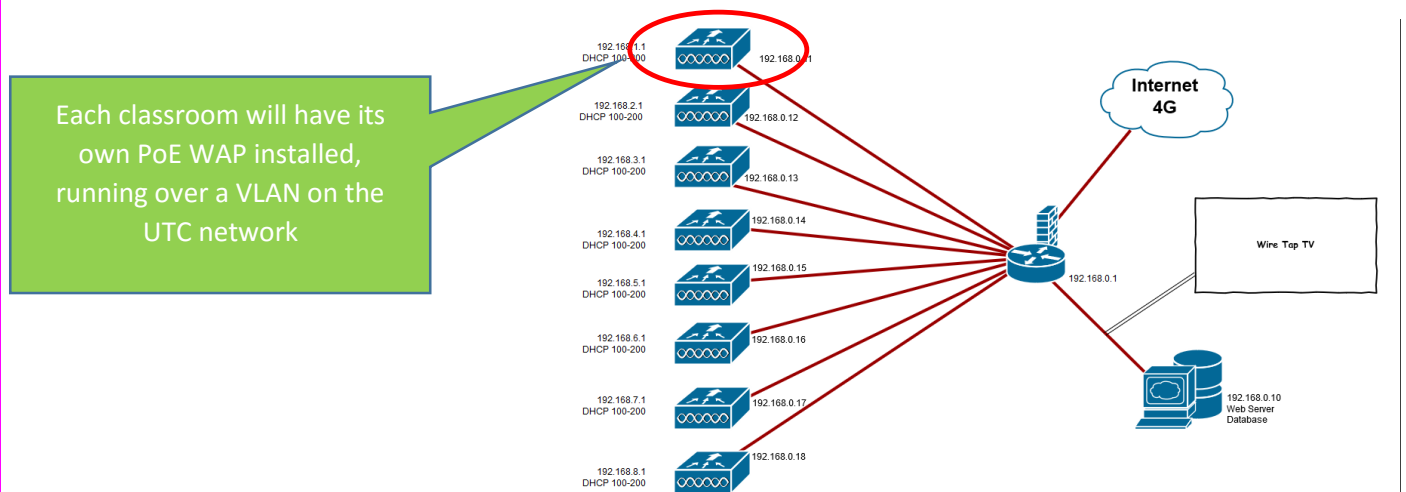
- Ability to work effectively in a team, with clearly defined roles
    - Are all team members actively contributing to the task?
    - Are all team members fully supportive of each other during tasks?
- Planning and presentation skills
    - Use of MS Planner (Office 365) to identify roles and tasks
    - Use of MS Visio to show network designs and business uses in industry
    - Use of MS PowerPoint to present work at IoT Expo
- Technical proficiency
    - Does the solution work?
    - Is the build of high quality?
    - Is it complete at the end of the workshop?
- Business Case: Identification of application in industry
    - Describe how a specific industry sector can use each solution
    - Identify the benefits to the business – present an ROI justification (how much money will a business save by using this solution?)

IoT Expo, 3rd April 2017:

Your teams will be evaluated by Cisco to identify the best performing teams overall. Cisco will also be seeking to identify individuals of outstanding merit.

Technical Environment

During each workshop, teams will be set a technical task of building an IoT solution. These details will be made available to you at the beginning of each workshop.

Each classroom will have its own PoE WAP installed, running over a VLAN on the UTC network

192.168.1.1
DHCP 100-200
192.168.0.11

192.168.2.1
DHCP 100-200
192.168.0.12

192.168.3.1
DHCP 100-200
192.168.0.13

192.168.4.1
DHCP 100-200
192.168.0.14

192.168.5.1
DHCP 100-200
192.168.0.15

192.168.6.1
DHCP 100-200
192.168.0.16

192.168.7.1
DHCP 100-200
192.168.0.17

192.168.8.1
DHCP 100-200
192.168.0.18

Internet 4G

Wire Tap TV

192.168.0.1

192.168.0.10
Web Server
Database

Each team will connect via the WAP to build and manage their IoT solution

Internet 4G

Classroom

192.168.1.1
DHCP 100-200
192.168.0.11

Wire Tap TV

192.168.0.1

192.168.0.10
Web Server
Database

Programming details will be saved on our secure server

Project coordination

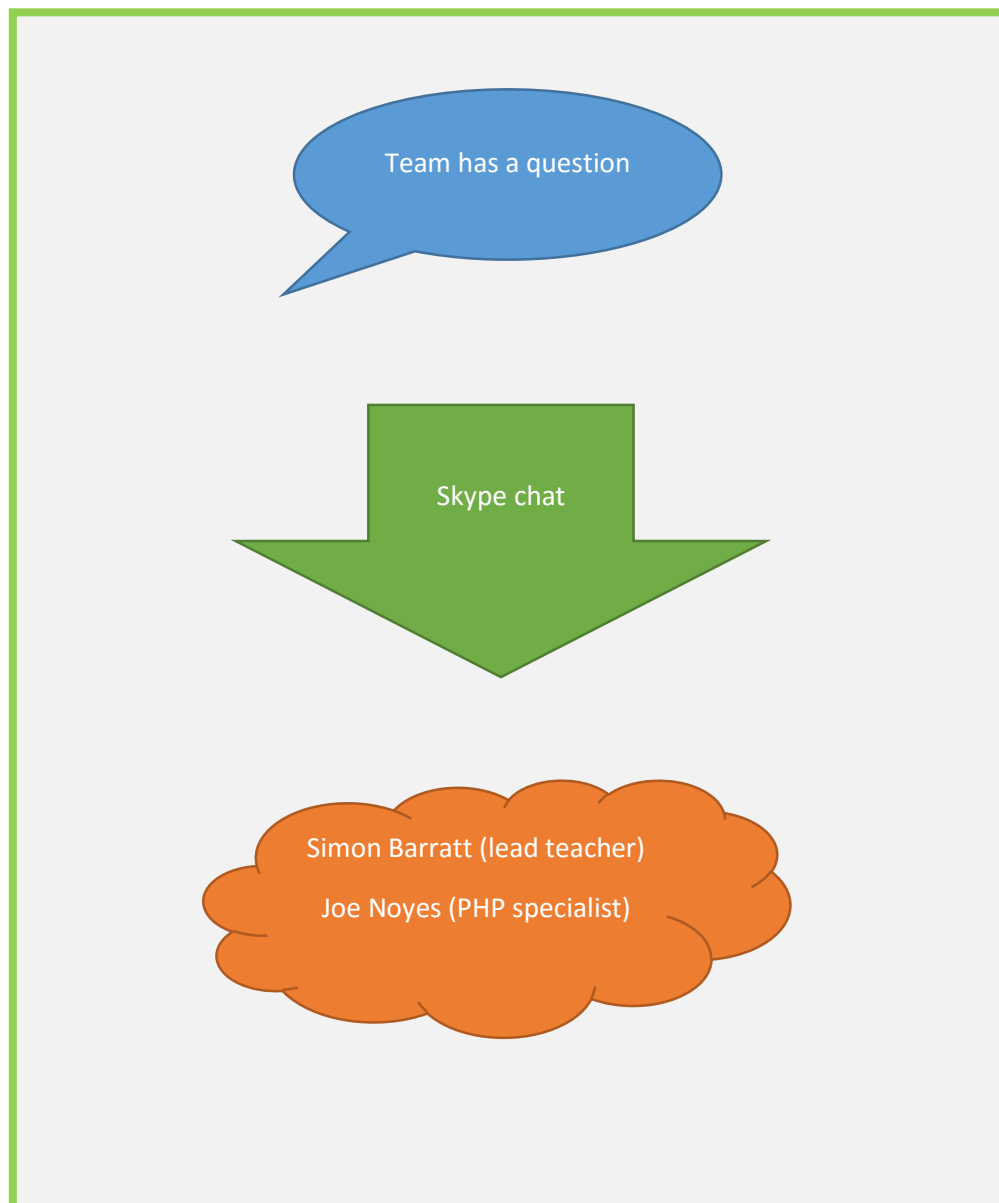You will be in a classroom with 5-6 teams of students.

Each team will have 4-6 students in the team.

There will be at least one teacher and one Cisco mentor in the room at all times.

Each workshop is a milestone – you must complete the IoT build in that timeframe.

As teachers and Cisco mentors will not necessarily have the right technical skills to support students in their technical work, the following process should be followed to ensure support is available for students:

Please note: response will not always be immediate. Please always attempt to find answers to questions or queries prior to contacting the technical team

Team has a question

Skype chat

Simon Barratt (lead teacher)

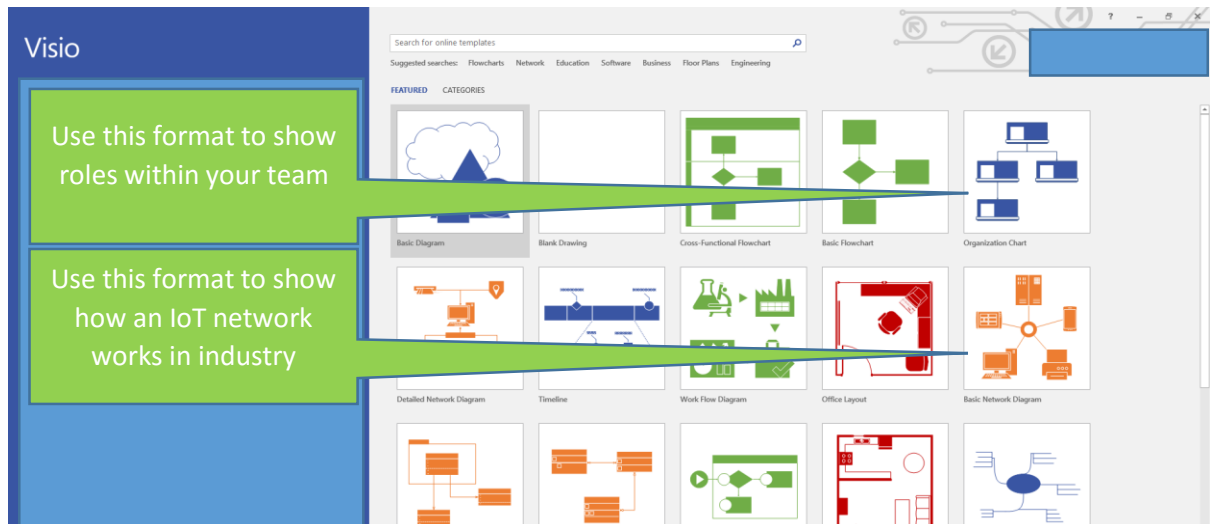Joe Noyes (PHP specialist)

Schedule:

Stream	Workshop 1: all day, 02/11/2016	Workshop 2: 06/12/2016	Workshop 3: 26/01/2017	Workshop 4: 27/02/2017	Workshop 5: 31/03/2017	Workshop 6: all day, 03/04/2017
Brunel	Launch: IoT World team forming, HTML & PHP set up / Cisco IoT specialist briefing, meet your Cisco mentors	Computer Vision	Beacon	Barcode	RFID	Problem Solving & Business Case preparation / IoT Expo and Judging
Faraday		RFID	Computer Vision	Beacon	Barcode	
Chips		Barcode	RFID	Computer Vision	Beacon	
Code		Beacon	Barcode	RFID	Computer Vision	

Resources and Tips

Check out Cisco IoT here to support your Business Case:

Cisco IoT overview and industry sectors

MS Visio basic functions for this project:

Use this format to show roles within your team

Use this format to show how an IoT network works in industry

MS Planner basic instructions for setting up your team Planner:

New Plan

Create a new Planner, including your team name

Plan name
[Team name] Cisco IoT World 2016 ✓

Plan email address
✓

Make sure it is not public

Make this plan public ⓘ ▮ No

Plan description
To enable our team to plan our tasks effectively

Create plan

Create Plan   Cancel

Once the plan is created, invite your team colleagues so that each team member can contribute