



THIS WORKBOOK BELONGS TO:

Student workbook

# INTERNET OF THINGS COURSE

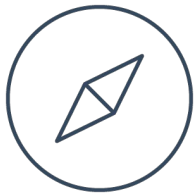


# Welcome

**In this project, you and your team will work together to design and build an app that solves a problem you care about.**

# The process

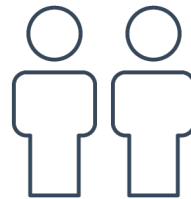
You will work your way through a range of activities, split across 5 modules.



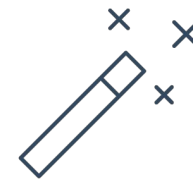
1. Crash course



2. Idea generation



3. Scoping



4. Product development

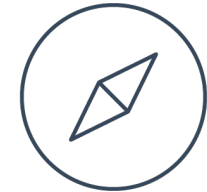


5. Pitch



## MODULE 1

# CRASH COURSE



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### Session 1

Launch

#### Activity

- 1.1 – [What is the Internet of Things?](#)
- 1.2 – [Benefits and risks of IoT](#)
- 1.3 – [Researching IoT Devices](#)

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### Session 2

Sensors and Boards

#### Activity

- 1.4 – [Enter project details](#)
- 1.5 – [Agree team values](#)
- 1.6 – [Sign the co-founder agreement](#)
- 1.7 – [Sensors](#)

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### Session 3

Skills Building

## ACTIVITY 1.1

### WHAT IS INTERNET OF THINGS?

## MODULE 1

### CRASH COURSE



#### Questions to answer before you watch the video

Have you heard of the term Internet of Things? YES / NO  
If yes what do you think it means?

#### After you have watched the video

What is the Internet of Things?

Give an example of an Internet of Things device from the video?

Extension - What has made the Internet of Things possible?

Understanding what IoT is and how it functions should help you recognise where you are interacting with IoT devices in real life.

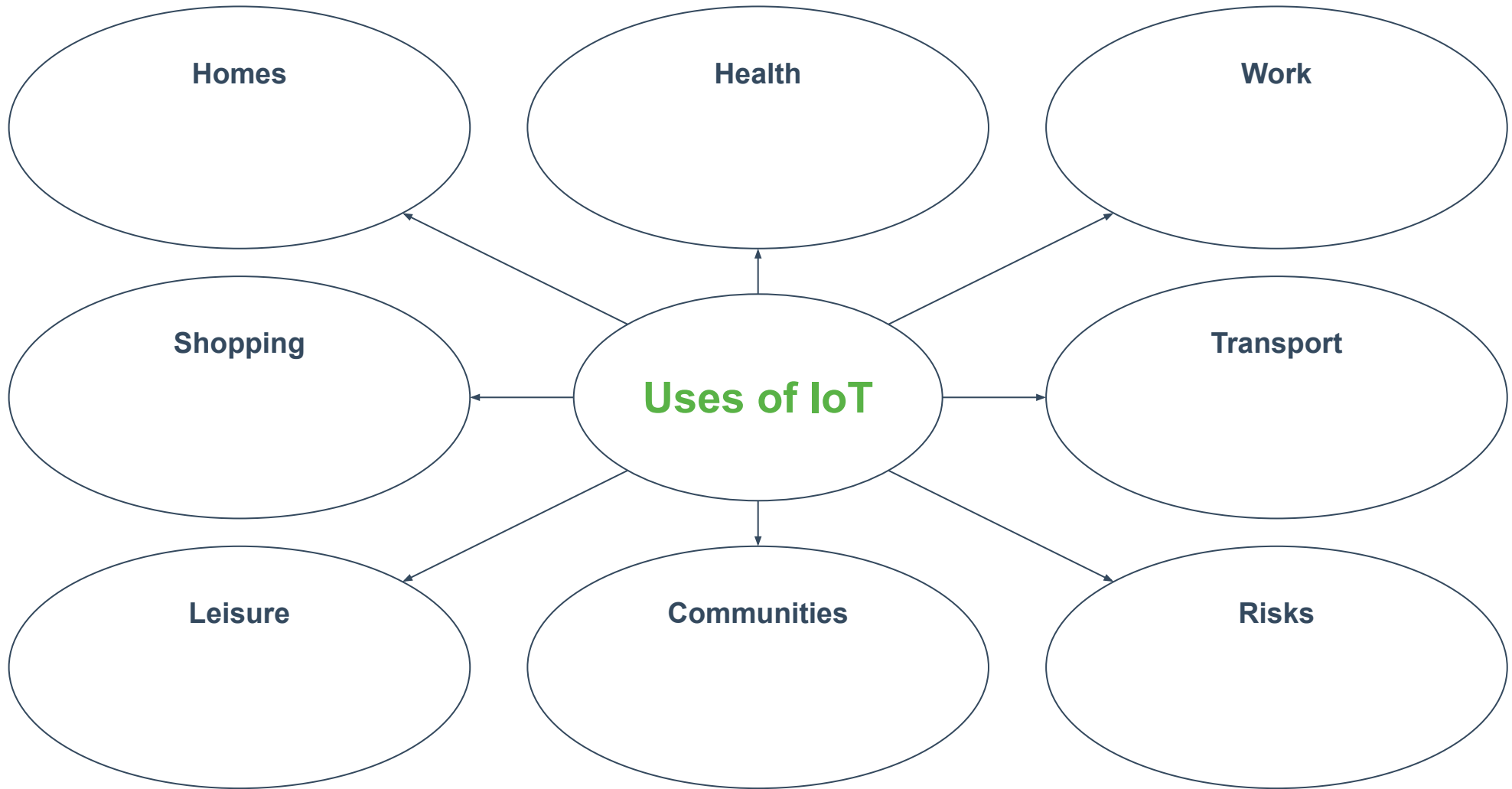
NAME

**ACTIVITY 1.2**

**BENEFITS AND RISKS OF IoT**

**MODULE 1**

**CRASH COURSE**



Use this page to draw out your mindmap of the benefits and risks of IoT

**NAME**

### ACTIVITY 1.3

## HOMEWORK - RESEARCHING IoT DEVICES

### MODULE 1

## CRASH COURSE



IoT device 1	IoT device 2	IoT device 3
Device name	Device name	Device name
What it does	What it does	What it does
Who makes it?	Who makes it?	Who makes it?
Price	Price	Price

Use this page to record you homework research

NAME

## ACTIVITY 1.4

### ENTER PROJECT DETAILS

## MODULE 1

### CRASH COURSE



Basic details	Success criteria
<p>Name</p> <p>Class</p> <p>Project start date</p> <p>Project end date</p>	<p>Project</p> <p>Teamwork</p>

To get your project started, make a record of your team and project details. Set yourself some success criteria. What would you like to achieve as a result of completing this project? e.g. improve your programming skills, improving the way you communicate with others.

**NAME**



## ACTIVITY 1.5

### AGREE TEAM VALUES

## MODULE 1

### CRASH COURSE



<h3>User-centred</h3> <p>Having the needs of the person who will be using the product as the most important or focal element.</p>	<h3>Innovative</h3> <p>Featuring something new or advanced, through original and creative thinking.</p>	<h3>Curious</h3> <p>Eager to know or learn something. This could be about people, places, or things around you.</p>
<h3>Creative</h3> <p>Creating something through good imagination or original ideas, or through mixing existing ideas.</p>	<h3>Collaborative</h3> <p>Working well as a team, or with other teams, to successfully achieve something.</p>	<h3>Business-savvy</h3> <p>Shrewd and knowledgeable about business, and having common sense and good judgement.</p>
<h3>Ethical</h3> <p>Avoiding activities or organizations that do harm to people or the environment.</p>	<h3>Passionate</h3> <p>Caring deeply about something. This could be about an idea or the thing you are creating.</p>	<h3>Hard-working</h3> <p>Working with energy, being committed, and doing your best to achieve something.</p>

Which of these team values are most important to your team? Discuss with the rest of the team and tick the five which best represent your values.

NAME

## ACTIVITY 1.6

### SIGN THE CO-FOUNDER AGREEMENT

## MODULE 1

### CRASH COURSE



Discuss these questions and tick as appropriate			Signatures and share ownership	
How will decisions get made?	<input type="checkbox"/> MAJORITY	<input type="checkbox"/> PLURALITY	SIGNED	%
How will share ownership be split?	<input type="checkbox"/> EQUALLY	<input type="checkbox"/> OTHER	SIGNED	%
What happens if a team member leaves?	<input type="checkbox"/> LOSES SHARES	<input type="checkbox"/> KEEPS SHARES	SIGNED	%
<b>Discuss these values and tick five that are most important to the team</b>			SIGNED	%
<input type="checkbox"/> USER-CENTRED	<input type="checkbox"/> INNOVATIVE	<input type="checkbox"/> CURIOUS	SIGNED	%
<input type="checkbox"/> CREATIVE	<input type="checkbox"/> COLLABORATIVE	<input type="checkbox"/> BUSINESS-SAVVY	SIGNED	%
<input type="checkbox"/> ETHICAL	<input type="checkbox"/> PASSIONATE	<input type="checkbox"/> HARD-WORKING	DATE	

It's important that all team members agree some things from the start. Decide how decisions will get made. 'Majority' means that a decision requires support from more than 50% of team. 'Plurality' means the largest number of voters.

**NAME**

**ACTIVITY 1.7**  
**SENSORS**

**MODULE 1**  
**CRASH COURSE**



<b>Sensors in the video</b>		
<b>Sensors in the home</b>	<b>Sensors at school</b>	<b>Sensors at the shops</b>
<b>Sensors when travelling</b>	<b>Sensors in the community</b>	<b>Other</b>

Are you aware of how many sensors are all around us?

**NAME**

## MODULE 2

# IDEA GENERATION



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### Session 4

What's your problem?

#### Activity

- 2.1 – [Spot possible problems](#)
- 2.2 – [Explore problems using the 5 Ws](#)
- 2.3 – [Draft mini elevator pitches](#)

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### Session 5

Screening ideas

#### Activity

- 2.4 – [Filter through problems](#)
- 2.5 – [Conduct market research](#)
- 2.6 – [Narrow to 3 elevator pitches](#)

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### Session 6

Industry Engagement

#### Activity

- 2.7 – [Present elevator pitches](#)
- 2.8 – [Choose an idea to take forward](#)

## ACTIVITY 2.1

### SPOT POSSIBLE PROBLEMS

## MODULE 2

### IDEA GENERATION



My problems and issues	Family and friends	Wider community

Designing a successful IoT device starts with finding a real problem that needs a solution. Brainstorm problem ideas with your team and record them here.

NAME

## ACTIVITY 2.2

### EXPLORE PROBLEMS USING THE 5 WS

## MODULE 2

### IDEA GENERATION



Problem	Who?	What?
Where?	When?	Why?

You'll need to understand the problems you've identified inside and out. Divide your problem ideas up amongst your team and note down the 5Ws below for each.

NAME

## ACTIVITY 2.3

### DRAFT MINI ELEVATOR PITCHES

## MODULE 2

### IDEA GENERATION



<b>Pitch idea</b>	
Our team is called...	
We're creating an IoT device aimed at...	<i>(the target user)</i>
to help them to...	<i>(the problem / challenge)</i>
by providing them with...	<i>(the possible solution)</i>

Turn problems into product ideas with a mini 'elevator pitch' *Our team is called SafeStep. We're creating an IoT device aimed at vulnerable older people to help them alert carers when they have a fall or leave the house unexpectedly..*

**NAME**

**ACTIVITY 2.4**

**FILTER THROUGH PROBLEMS**

**MODULE 2**

**IDEA GENERATION**



*Mass market ideas*

**Lots of people affected**

*Game-changing ideas*

**Low impact on people's lives**

**High impact on people's lives**

*Low appeal ideas*

**Few people affected**

*Niche ideas*

If you're going to invest time in designing an IoT device, you need to be sure your problem is worth solving. For the problems you've identified, consider how many people it impacts, and level of impact, then plot each problem in the 2x2 grid. Problems bottom left are unlikely to be successful.

**NAME**





## ACTIVITY 2.5

### CONDUCT MARKET RESEARCH

## MODULE 2

### IDEA GENERATION



<b>IoT device idea</b>	Number of similar devices <input type="checkbox"/> None <input type="checkbox"/> Up to 5 <input type="checkbox"/> More than 5		
<b>For the existing device closest to your IoT device idea complete the following</b>			
Name of device	Price		
Target user	Features meeting user needs		

There's little point in designing an IoT device that offers something someone else is already doing well. You need to make sure you know who your competitors are. Divide your mini elevator pitches amongst your team. For each, find related apps that are already available.

**NAME**



## ACTIVITY 2.7

### PRESENT ELEVATOR PITCHES

## MODULE 2

### IDEA GENERATION



Questions for industry expert / other teams

IoT device idea 1 – Feedback	IoT device idea 2 – Feedback	IoT device idea 3 – Feedback

Talking with an industry Expert can give you a chance to ‘reality check’ your IoT device idea and make sure you’ve thought of everything you need to make sure your project is a success. Use this page to prepare for your Industry Engagement session and record the feedback they give you.

**NAME**

## ACTIVITY 2.8

### CHOOSE AN IDEA TO TAKE FORWARD

## MODULE 2

### IDEA GENERATION



IoT device idea 1	IoT device idea 2	IoT device idea 3
<p data-bbox="125 451 409 486">IoT device name</p>  <p data-bbox="125 715 562 750">Number of people affected</p> <div data-bbox="143 778 748 826"><input type="text"/></div> <p data-bbox="125 900 658 935">Level of impact on people's lives</p> <div data-bbox="143 963 748 1011"><input type="text"/></div> <p data-bbox="125 1082 562 1117">Technical feasibility of idea</p> <div data-bbox="143 1145 748 1193"><input type="text"/></div> <p data-bbox="125 1267 613 1302">Understanding of the problem</p> <div data-bbox="143 1331 748 1378"><input type="text"/></div>	<p data-bbox="804 451 1088 486">IoT device name</p>  <p data-bbox="804 715 1240 750">Number of people affected</p> <div data-bbox="822 778 1426 826"><input type="text"/></div> <p data-bbox="804 900 1337 935">Level of impact on people's lives</p> <div data-bbox="822 963 1426 1011"><input type="text"/></div> <p data-bbox="804 1082 1240 1117">Technical feasibility of idea</p> <div data-bbox="822 1145 1426 1193"><input type="text"/></div> <p data-bbox="804 1267 1292 1302">Understanding of the problem</p> <div data-bbox="822 1331 1426 1378"><input type="text"/></div>	<p data-bbox="1476 451 1760 486">IoT device name</p>  <p data-bbox="1476 715 1912 750">Number of people affected</p> <div data-bbox="1494 778 2098 826"><input type="text"/></div> <p data-bbox="1476 900 2009 935">Level of impact on people's lives</p> <div data-bbox="1494 963 2098 1011"><input type="text"/></div> <p data-bbox="1476 1082 1912 1117">Technical feasibility of idea</p> <div data-bbox="1494 1145 2098 1193"><input type="text"/></div> <p data-bbox="1476 1267 1964 1302">Understanding of the problem</p> <div data-bbox="1494 1331 2098 1378"><input type="text"/></div>

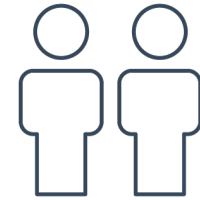
Decide which of your ideas to develop into an IoT device. Grade each device idea based on the criteria above. Circle or tick the device idea you have chosen to take forward.

NAME

## MODULE 3

# SCOPING

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### Session 7

Get to know your  
users

### Activity

- 3.1 – [Create a user profile](#)
- 3.2 – [List user needs and features](#)
- 3.3 – [Conduct a user survey](#)

### ACTIVITY 3.1

## CREATE A USER PROFILE

### MODULE 3

## SCOPING



User details 1	Drivers	User details 2	Drivers
Name	Key goals of the user	Name	Key goals of the user
Age		Big frustrations of the user	
Occupation	Location		Occupation
Location			

To make sure your IoT device features are fit for purpose, you need to have a very clear idea of who your users are and what they want.

NAME

## ACTIVITY 3.2

### LIST USER NEEDS AND FEATURES

## MODULE 3

### SCOPING



User need	User need	User need
Feature idea	Feature idea	Feature idea
Sensors and actuators required	Sensors and actuators required	Sensors and actuators required

Explore your user's needs in more detail. Try to come up with ideas for features that could meet those needs.

NAME

### ACTIVITY 3.3

## CONDUCT A USER SURVEY

### MODULE 3

## SCOPING



Questions for the survey	Key results from the survey

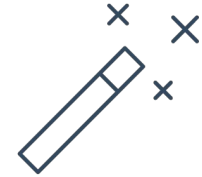
Create a survey to find out more about potential users. Use pen, paper, and a clipboard to run your survey. Or use an online form builder, such as [Google Forms](#), [Wufoo](#), [Survey Monkey](#), or [Typeform](#).

NAME



## MODULE 4

# PRODUCT DEVELOPMENT



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### Session 8

MVP planning

### Activities

4.1 – [Evaluate product features](#)

4.2 – [Design MVP](#)

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### Session 9

Build MVP

### Activity

4.3 – [Conduct a user test](#)

**ACTIVITY 4.1**

**EVALUATE PRODUCT FEATURES**

**MODULE 4**

**PRODUCT DEVELOPMENT**



*Features to simplify*

**Most useful features**

*MVP features*

**Unfeasible (Tech & Data)**

**Feasible (Tech & Data)**

*Non-essential features*

**Least useful features**

*For future versions*

You need an app that has at least one essential feature for your user, and that feature needs to be technically feasible. Review your list of possible features and decide where on this grid they belong. Are these features essential? Are they technically feasible?

**NAME**



**ACTIVITY 4.2**  
**DESIGN MVP**

**MODULE 4**  
**PRODUCT DEVELOPMENT**



Thinking about essential, feasible features, sketch out how you want your IoT device to look.

**NAME**



**ACTIVITY 4.2**  
**DESIGN MVP**

**MODULE 4**  
**PRODUCT DEVELOPMENT**



Thinking about essential, feasible features, sketch out how you want your IoT device to look.

**NAME**



### ACTIVITY 4.3

## CONDUCT A USER TEST

### MODULE 4

## PRODUCT DEVELOPMENT



Person we're testing with	
Positives	Suggested improvements
Next steps	

Find time to conduct the test. Inform the test subject of how long it will take, and thank them for their time. Make notes of the feedback.

NAME

## MODULE 5

# PITCH

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### Session 10

Pitch it

### Activities

- 5.1 – [Prepare your pitch](#)
- 5.2 – [Reflect on your project](#)
- 5.3 – [Teacher feedback](#)

## ACTIVITY 5.1

### PREPARE YOUR PITCH

## MODULE 5

### PITCH



IoT device name and slogan	Our problem	Our IoT device
Team member _____ Notes:	Team member _____ Notes:	Team member _____ Notes:
Our prototype	Target users	Conclusion
Team member _____ Notes:	Team member _____ Notes:	Team member _____ Notes:

It is now time to tell people about your IoT device idea. Telling other people about your product and persuading them to buy it is known as pitching. Use this worksheet to divide up the presentation and allocate sections to each member of the team.

NAME

## ACTIVITY 5.2

### REFLECT ON YOUR PROJECT

## MODULE 5

### PITCH



<b>What has gone well with your IoT device development?</b>	<b>What could have gone better with your IoT device development?</b>
<b>What has been good about how your team has worked together?</b>	<b>How could your team have worked better together?</b>

Reviewing a project helps you identify what went well, and what not so well, so that you can improve how you work in your next project. It's something all tech development teams do. Review your progress against the success criteria you drew up at the start of the project.

**NAME**



**ACTIVITY 5.3**  
**TEACHER FEEDBACK**

**MODULE 5**  
**PITCH**



What went well	Even better if
<b>Targets and next steps</b>	

Your teacher will use this page to provide you with feedback.

**NAME**

# Ace, course complete!

**Making great IoT devices requires hard work and constant improvement. IoT device development is a journey. Where will your journey end?**



# Using these materials

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