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Lego Zip-wire Workshop Session Plan

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Workshop Schedule

"By failing to prepare, you are preparing to fail."

Day 1

Event Set Up	30 minutes	
Welcome/Pre-Day Forms	5 minutes	(Slide 1)
Introductions	20 minutes	(Slides 2-3)
Explanation	60 minutes	(Slides 4-8)
Memory Game	10 minutes	(Slides 9-10)
Lego and building	180 minutes	(Slides 11-13)
Q&A/Post-day Forms	5 minutes	
Event Clean Up	30 minutes	

Total: 4 hours 40 minutes for attendees
Total: 5 hours 40 minutes for staff

Day 2

Event Set Up	30 minutes	
Welcome/Pre-Day Forms	5 minutes	(Slide 14)
Building & designing	60 minutes	(Slide 15)
Fox, hay & sheep challenge	20 minutes	(Slide 16)
Continue building	120 minutes	
Main challenge	60 minutes	(Slide 17)
Q&A/Post-day Forms	5 minutes	
Event Clean Up	30 minutes	

Total: 4 hours 30 minutes for attendees
Total: 5 hours 30 minutes for staff

Workshop Schedule

"By failing to prepare, you are preparing to fail."

Day 3

Event Set Up	30 minutes	
Welcome/Pre-Day Forms	5 minutes	(Slide 18)
Introductions	60 minutes	(Slides 19-28)
App Inventor	180 minutes	
Marking and competition	60 minutes	
Q&A/Post-day Forms	5 minutes	
Event Clean Up	30 minutes	

Total: 4 hours 40 minutes for attendees
Total: 5 hours 40 minutes for staff

Hardware and Software Requirements

1. LEGO NXT Mindstorm kit per group.
2. Laptop per person / atleast one per group.
3. iPad per person.

Attendee Prerequisites

1. No previous programming experience required.
2. Previous experience working in teams

Learning Outcomes

1. To learn more about Mechanical Engineering and Computer Science.
2. Develop key skills such as application of number, logic, problem solving and team work.
3. Solving a real-life problem in the local area.

Event Set Up and Clean Up

Event Set Up

1. Prepare any pre and post-day questionnaire forms as required. Remember spare pens / pencils.

2. Ensure tables and chairs are arranged to naturally encourage people to sit in groups; ensure no one is sitting with their back to the podium.

3. Test display equipment (e.g. projector) and ensure that presentation and internet connection are working and ready for use.

4. Set up, preferably in a tall lecture theatre or similar, a climbing rope attached to either ends of the room on a decline.

Event Clean Up

1. Ensure all pre-day and post-day questionnaire forms have been collected if required.

2. Make sure all lego pieces are taken apart and returned to the box.

3. Apps to be appropriately saved on USB sticks or on accounts.

4. Clear up litter and refuse. Remember to recycle where facilities exist. Remember to switch off lights, computers, and projectors!

Introduction

Welcome and Pre-day Forms

The first 5 minutes is very much about welcoming and encouraging people to complete any pre-day forms before the workshop begins. Also ensure you read through the pre-day forms with the participants to confirm they have been filled in correctly.

Ensure that you welcome the attendees as they enter the room; this helps to create a positive connection.

Introduction

The introduction gives you time to introduce everyone involved with hosting the workshop.

It is not necessary at this point to give an elaborate history of every person involved; try to keep to simple facts.

The main aim is to have everyone settled, focused, and filling required forms, e.g. pre- and post-day questionnaires.

Example Introduction

(Slide 1: Technocamps)

"I'm XXX and I work for an across-Wales organisation called Technocamps.

Has anybody heard of Technocamps before or been to one of our workshops?

We are a £6 million government funded organisation working towards getting young adults and children of the ages 11-19 years old excited about Computer Science and what it has to offer you, in both your education and a future career."

(Slides 2 & 3: Introduction)

Introduce the group to what everyone will be doing over the next 3 days, explain that everyone will be working in teams, working towards a real-life problem in a fun, hands on environment. Discuss Engineering and Computer Science, what does the group know about these disciplines before the bootcamp begins?

(Slide 4 &5:The problem & Task)

The groups will be solving a problem related to Europe's longest zip-wire using Lego Mindstorm robots to prototype their solutions. These robots will be tested on a smaller zip-line, using climbing rope. The aim is to identify markers on the line, highlighted with coloured tape. Once identified, the robot prototype will release a ping pong ball. In the real-life scenario, this ping-pong ball would be a GPS signal, identifying a problem area on the zip-line.

Scratch

(Slides 6: Teams & roles)

Each team will be a group of 3, each member of the group will be assigned a role. Each team member can be either a "programmer", "designer" or "builder".

(Slide 7: Marking scheme)

Each group will be marked throughout the process for various factors ranging from organisation to accounting and budgeting. Whoever has the most marks at the end, wins.

(Slides 8 - 11: LEGO)

Lego Mindstorm kits will be used to prototype their designs, but recognising what sensors are what will be incredibly helpful during this process. Discuss how lego kits can be used to prototype robot designs and in what way. Complete the "mini challenge" with the group, discuss the different types of sensors and see if they can work out which is which from the images provided on slide 11.

(Slide 12: Budgeting)

Each group will be given 100 Techno £££s which will be used to purchase components, designs etc. These purchases will be monitored by the group's programmer.

(Slide 13: Building & Design)

Initially the groups will need to discuss and design their concepts, then begin building and coding them, testing them on the zip-wire during the process.

Scratch

(Slides 14 & 15: Welcome back)

On the 2nd day the groups will need to continue their planning, designing, developing and building ready for the challenge.

(Slide 16: Fox, Hay and Sheep)

This Technocamps app can be downloaded from the AppStore for free. The group should be talked through the app and its rules, then given some time to work out how many moves it would take to cross all the animals/objects from one side of the river to another.

(Slide 17: The Challenge)

Each group will compete against one-another testing if the robots can manoeuvre down the zip-wire, identifying the "problem areas" by releasing ping pong balls - symbolising GPS signals alerting staff of problem on the zip-line.

Scratch

(Slide 18: Welcome back)

On the 3rd day the groups will be learning about App Inventor to create Android applications promoting the robot prototype each team had created and developed.

(Slide 19: Programming)

What is programming? Discuss with the group what they think of programming, particularly after coding for their robots. How would the attendees describe "programming"?

(Slide 20: App Inventor)

App Inventor is the software being used, you will require a google mail account to use this, however if you are within a Technocamps workshop/bootcamp, these can be issued.

(Slides 21 - 24: Appearance)

The appearance of an app is just as important as its content. How does the app look? Is it easy to use? Discuss with the group any apps they may think of that aren't easy to use or difficult to understand.

(Slides 25 - 28: App Inventor)

This next few slides introduce the interface and the blocks editor. Each group must produce an app with ideally 4 pages:

Page 1 - Group logo and team name
Page 2 - Summary of design process
Page 3 - Photo summary
Page 4 - Improvements to make after challenge on day 2.

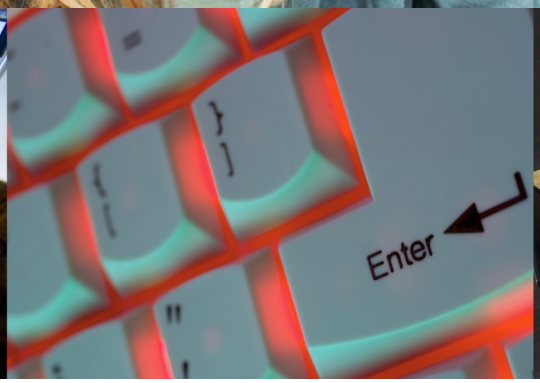
Q&A Session & Closure

(Take several questions from the attendees)
(If no questions are asked by attendees, begin summarising topics covered)

Once an appropriate number of questions has been taken, you can then begin to close the workshop. Be sure to have any post-day questionnaire forms filled in by attendees as required. Some audiences may require more prompting to fill in such forms.

Closure and Post-day Forms

The last 5 minutes of closure must be used to, if required, ensure that post-day questionnaires are filled in by the attendees and talk them through the information they have filled in. Ensure that you collect all of the post-day form in before attendees depart, and be sure to thank each person for taking the time to fill in the forms.



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