technocamps

Inspiring | Creative | Fun
Ysbrydoledig | Creadigol | Hwyl

Lego Zip-wire Workshop Content

i.t.wales
www.itwales.com

Swansea University
Prifysgol Abertawe

Prifysgol Aberystwyth University

Prifysgol Bangor University

University of South Wales
Prifysgol De Cymru

ESF
Llywodraeth Cymru
Welsh Government
Ewrop & Chymru: Buddsoddi yn eich dyfodol
Cronfa Gymdeithasol Ewrop
Europe & Wales: Investing in your future
European Social Fund

Lego Zip-wire

This workshop, split over 3 days, incorporates two different disciplines within STEM: mechanical engineering and computer science. This combination offers participants an opportunity to introduce these subjects, to improve their team working skills and increase their understanding of potential employment or further study opportunities available to them.

The workshop uses a real-life engineering problem, where participants are asked to split in groups and use the LEGO NXT Mindstorm kits to develop robotic prototypes as a solution to the given problem(s). Each group is given a "budget" to spend on tools, equipment and components in order to build their robot, but first each team must decide what will be needed and what is affordable.

Europe's longest Zip Wire

Europe's longest and fastest zip line can be found in "Zip World" based in the Penrhyn Quarry in Bethesda, North Wales near the mountains of Snowdonia. Penrhyn Quarry in the nineteenth century was the largest slate quarry in the world.

The zip line carries you 500ft above the mountain lake at speeds of up to 100 mph! It is crucial, particularly at these speeds and height, that the zip lines are well looked after and maintained for the safety of all users and staff...

The problem:

Zip wires can become worn over time and can be very dangerous for users at high speeds over large drops. The team's job is to design a robotic prototype, that will need to travel along a wire and locate any problem areas along the "zip wire". These problem areas are represented by coloured patches, once the robot recognises the coloured patch a GPS Beacon to be sent signalling there is an error on the wire. These signals will be represented by pingpong balls.

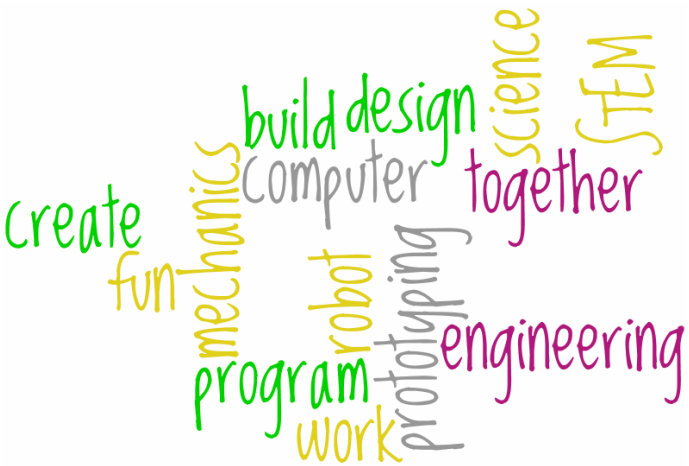
As problem solving is a major factor within both computer science and mechanical engineering, the groups will be applying this skill in addition to developing it further during the process, enhancing their understanding of robotics and prototyping. Each team will be awarded points for team work, design, accounting and budget management and on each day the teams will be assigned smaller challenges to complete.

Lego Zip-wire

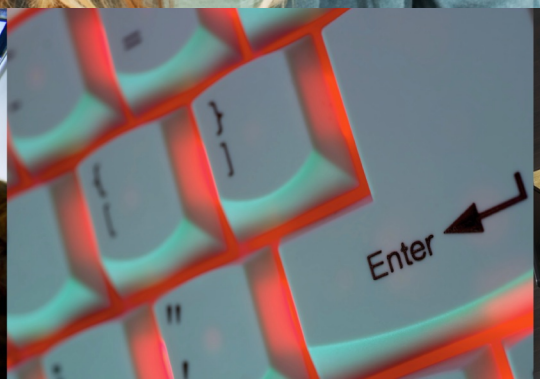
On day one,, the attendees will be introduced to one-another and split into groups of 3 and must decide upon a logo and a team name. The marking scheme will be explained before some mini challenges are conducted. Each team member will be assigned a role for the remainder of the bootcamp,. The roles to choose from are “programmer”, “designer” or “builder”. The LEGO kit will be introduced to the group and various components will be explained to attendees in preparation of designing and building their own robot prototypes. Prototypes will be designed, built and ideally the implementation will have begun at this stage.

On day two, the groups will be asked to continue building their robot prototypes, to make any final tweaks to their robot and complete all programming, making any last minute adjustments required. Mid-day, the groups will be assigned another problem solving challenge, discussing various solutions together. Towards the end of this day, the groups will have an opportunity to demonstrate their robots and compete against one-another. Their prototypes will be marked against each other to find out which group successfully produced a robot that released one ping pong ball over each marked problem area.

On the final day, groups will have an opportunity to discuss the challenge from yesterday and what improvements would they make to their robots and their design. Following this, the groups will be introduced to software called “App Inventor” enabling the creation of apps for Android devices.



The groups will be developing an app for their robot: page one will contain the group’s logo and team name, on the second page will be a summary of their design process, page three will contain a photo summary page and finally page four will contain the improvements discussed from earlier. These will be marked and put together with the marks from the previous 2 days.



technocamps

www.technocamps.com

@Technocamps

Find us on Facebook