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Southampton engineers a Raspberry Pi Supercomputer

Computational Engineers at the University of Southampton have built a supercomputer, from 64 Raspberry Pi computers and Lego.

The team, led by Professor Simon Cox, consisted of Richard Boardman, Andy Everett, Steven Johnston, Gereon Kaiping, Neil O'Brien, Mark Scott, and Oz Parchment along with Professor Cox's son James Cox (aged 6) who provided specialist support on Lego and system testing.

Professor Cox comments: "As soon as we were able to source sufficient Raspberry Pi computers we wanted to see if it was possible to link them together into a supercomputer. We installed and built all of the necessary software on the Pi starting from a standard Debian Wheezy system image and we have published a guide so you can build your own supercomputer."

The racking was built using Lego with a design developed by Simon and James, who has also been testing the Raspberry Pi by programming it using free computer programming software Python and Scratch over the summer. The machine, named "Iridis-Pi" after the University's Iridis supercomputer, runs off a single 13 Amp mains socket and uses MPI (Message Passing Interface) to communicate between nodes using Ethernet. The whole system cost under £2,500 (excluding switches) and has a total of 64 processors and 1Tb of memory (16Gb SD cards for each Raspberry Pi). Professor Cox uses the free plug-in 'Python Tools for Visual Studio' to develop code for the Raspberry Pi.

Professor Cox adds: "The first test we ran - well obviously we calculated Pi on the Raspberry Pi using MPI, which is a well-known first test for any new supercomputer."

"The team wants to see this low cost system as a starting point to inspire and enable students to apply high performance computing and data handling to tackle complex engineering and scientific challenges as part of our on-going outreach activities."

James Cox (aged 6) says: "The Raspberry Pi is great fun and it is amazing that I can hold it in my hand and write computer programs or play games on it."

If you want to build a Raspberry Pi Supercomputer yourself see:

<http://www.soton.ac.uk/~sjc/raspberrypi>

Ends

Notes to editors:

1. The Raspberry Pi is a credit-card sized computer that plugs into your TV and a keyboard. It's a capable little PC which can be used for many of the things that your desktop PC does, like spreadsheets, word-processing and games. It also plays high-definition video. The Raspberry Pi foundation want to see it being used by kids all over the world to learn programming (<http://www.raspberrypi.org/>).

2. The Faculty of Engineering and Environment at the University of Southampton engages with schools through a wide range of outreach programmes and this low cost system has the potential to inspire a whole new generation of engineers and scientists to develop and apply large scale high performance computing and data handling to tackle complex engineering and scientific challenges.

3. Engineering and the Environment at Southampton is a world-class centre for education, research and enterprise with over 400 staff and researchers, and 2300 students. We represent the largest and most diverse engineering and environmental science grouping in the UK. Our expertise looks deep below the Earth's crust, reaches into space and encompasses everything in between (<http://www.southampton.ac.uk/engineering/>).

4. The University of Southampton is celebrating its 60th anniversary during 2012.

Her Majesty Queen Elizabeth II, granted the Royal Charter that enabled the University of Southampton to award its own degrees in the early weeks of her reign in 1952.

In the six decades to follow, Southampton has risen to become one of the leading universities in the UK with a global reputation for innovation through academic excellence and world-leading research.

This year, the University's reputation continues to grow with the recent awarding of a Queen's Anniversary Prize for Higher and Further Education in recognition of Southampton's long-standing expertise in performance sports engineering. To find out more visit www.southampton.ac.uk/60

5. Useful external links [last checked 8th Sept 2012]:

Raspberry Pi Supercomputer Guide: <http://www.soton.ac.uk/~sjc/raspberrypi>

Raspberry Pi Foundation: <http://www.raspberrypi.org>

Python: <http://www.python.org/>

Scratch: <http://scratch.mit.edu/>

MPI: <http://www.mcs.anl.gov/research/projects/mpi/>

Python Tools for Visual Studio: <http://pytools.codeplex.com/>

Visual Studio through: <http://www.dreamspark.com>

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