Raspberry Pi

Computer Programming
Motivation

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Raspberry Pi Day
University of Strathclyde
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The problem

- Difficult to teach programming at University
  - From 13 years of teaching C++ in Universities
  - Several years of teaching applied statistics to masters students
- Students often understand mathematical and scientific concepts, but find programming difficult.
  - Computers are needed for general solutions or complex problems.
  - Stuck when one cannot buy the software needed
  - Students that cannot program miss opportunities
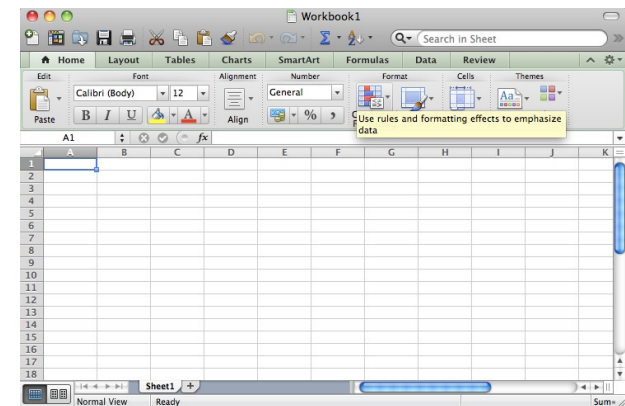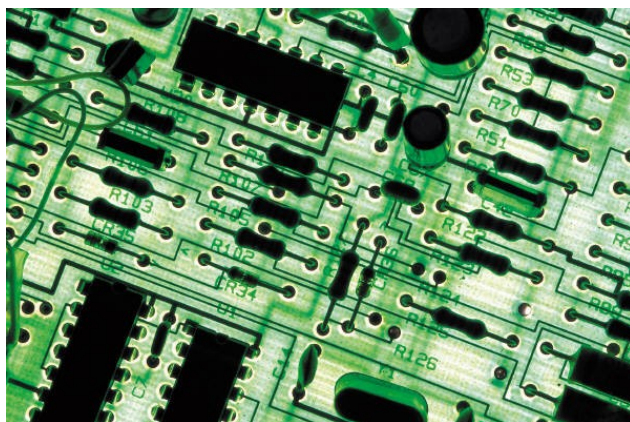
Previous education

Word processing

When I grow up I will learn to program.

I will learn to program.
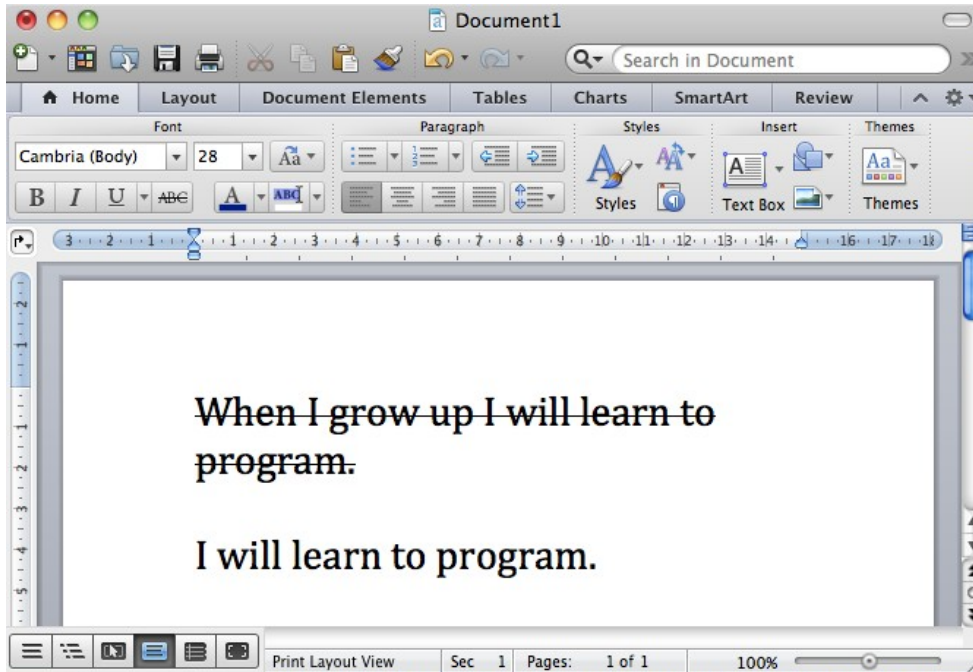
Some Scratch programming

Web surfing

Spreadsheet? HTML?

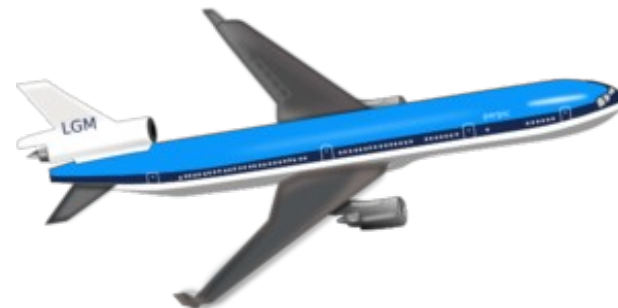# At home

Programming

Programming

Programming

Theoretical physics

Experimental physics

Muon Detectors   Tile Calorimeter   Liquid Argon Calorimeter

Toroid Magnets   Solenoid Magnet   SCT Tracker   Pixel Detector   TRT Tracker
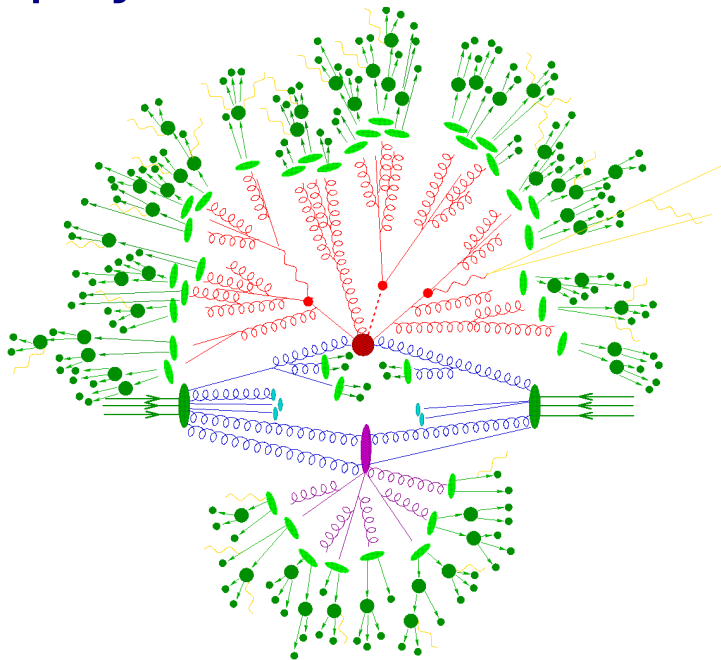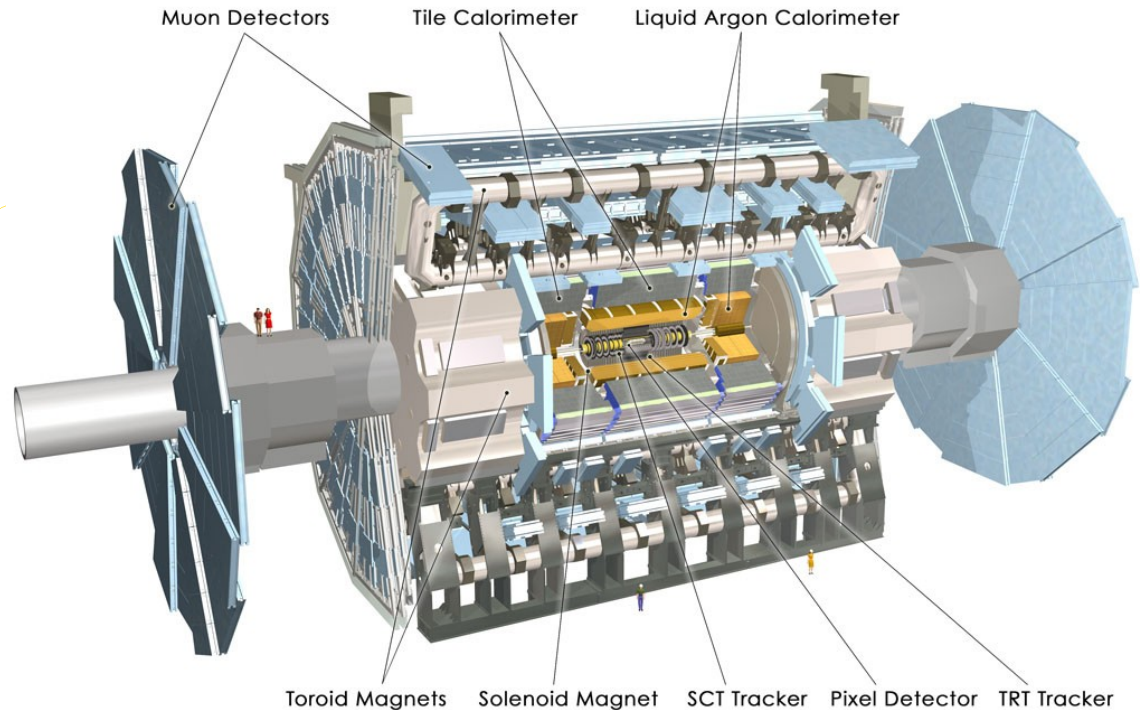
Project ideas

Oscilloscope

Submarine

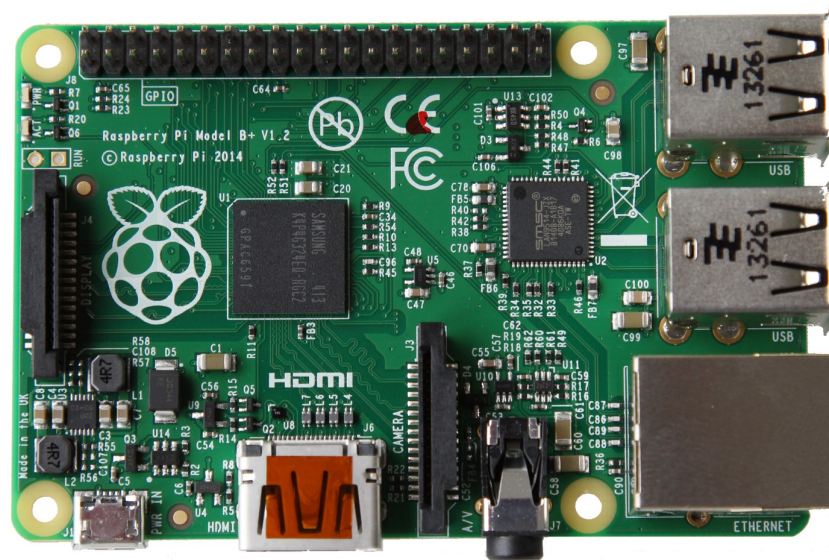Robotics

Web server

Weather station

WiFi access point

Spacecraft

File server

Home automation

GPIO Header & OS

|			
3.3V	1	2	5V
GPIO 2 (I2C1_SDA)	3	4	5V
GPIO 3 (I2C1_SCL)	5	6	GND
GPIO 4 (GPCLK0)	7	8	GPIO 14 (UART_TXD)
GND	9	10	GPIO 15 (UART_RXD)
GPIO 17	11	12	GPIO 18
GPIO 27	13	14	GND
GPIO 22	15	16	GPIO 23
3.3V	17	18	GPIO 24
GPIO 10 (SPI_MOSI)	19	20	GND
GPIO 9 (SPI_MISO)	21	22	GPIO 25
GPIO 11 (SPI_SCLK)	23	24	GPIO 8 (SPI_CE0)
GND	25	26	GPIO 7 (SPI_CE1)
ID_SD	27	28	ID_SC
GPIO 5	29	30	GND
GPIO 6	31	32	GPIO 12
GPIO 13	33	34	GND
GPIO 19	35	36	GPIO 16
GPIO 26	37	37	GPIO 20
GND	39	40	GPIO 21

Key

- 🔴 Power (5 Volts)
- 🟠 Power (3.3 Volts)
- ⚫ Ground
- 🟢 General Inputs/Outputs
- 🔵 I2C Interface
- 🟣 SPI Interface
- 🟡 UART Interface
- ⚪ ID EEPROM Interface
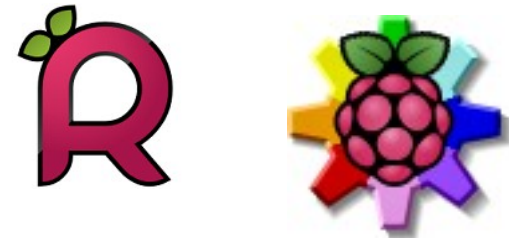
Development:
Android
Debian
FreeBSD
Gentoo
NetBSD
openSUSE
Plan 9
Puppy

Conclusions

- Need to reverse the decline in programming

- The Raspberry Pi provides a flexible solution

    – Allowing experimentation

    – Open OS & standard programming tools