

Programming and Data Analysis (PDA) (10 credits semester 1)

First part: Scientific Programming

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Scientific Programming

- Course structure
- Assessment and feedback
- Prior knowledge
- Why learn programming ... and why learn python
- Getting started

Course structure, who we are and what we do

Sem 1	PDA
weeks 2-7	Scientific Programming Phil Clark P.J.Clark@ed.ac.uk Cip Pruteanu Cip.Pruteanu@ed.ac.uk
weeks 8-11	Data Analysis Malcolm McMahon M.I.McMahon@ed.ac.uk Christian Storm Christian.Storm@ed.ac.uk

PDA

Course Organiser

Phil Clark
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Course Administrator

Katy Brown
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Course structure: workshops

Scientific Programming lab sessions

- **Mon, Wed, Thu 2:10-5:00pm (weeks 2-7)**
 - You attend ONE lab session each week
 - If you can't make your assigned session, you need to request a move using the [Group Change Request](#) form
- **JCMB 4325D / 4325C**
 - Recommend that you bring your own laptop
 - There are Linux workstations available if you prefer not to do this

Course structure cont.

Programming workshops

- Work on code examples and the checkpoints
- Help and feedback on programming approaches
- Checkpoints assessed with individual feedback on performance

Self-study

- Study the online notes and online mini-lectures
 - Complete the multiple-choice self-test questions
 - Run and understand the code examples
 - Work on the assessed checkpoints
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- We have recommended *Weekly Tasks* in the course materials with details of what you need to do each week (feel free to work ahead if you wish)

Scientific Programming Assessment

- Assessed by six checkpoints within the computing lab sessions
- You should aim to pass all checkpoints, but one fail will be discarded
- **Checkpoints must be assessed by deadlines (no extensions)**

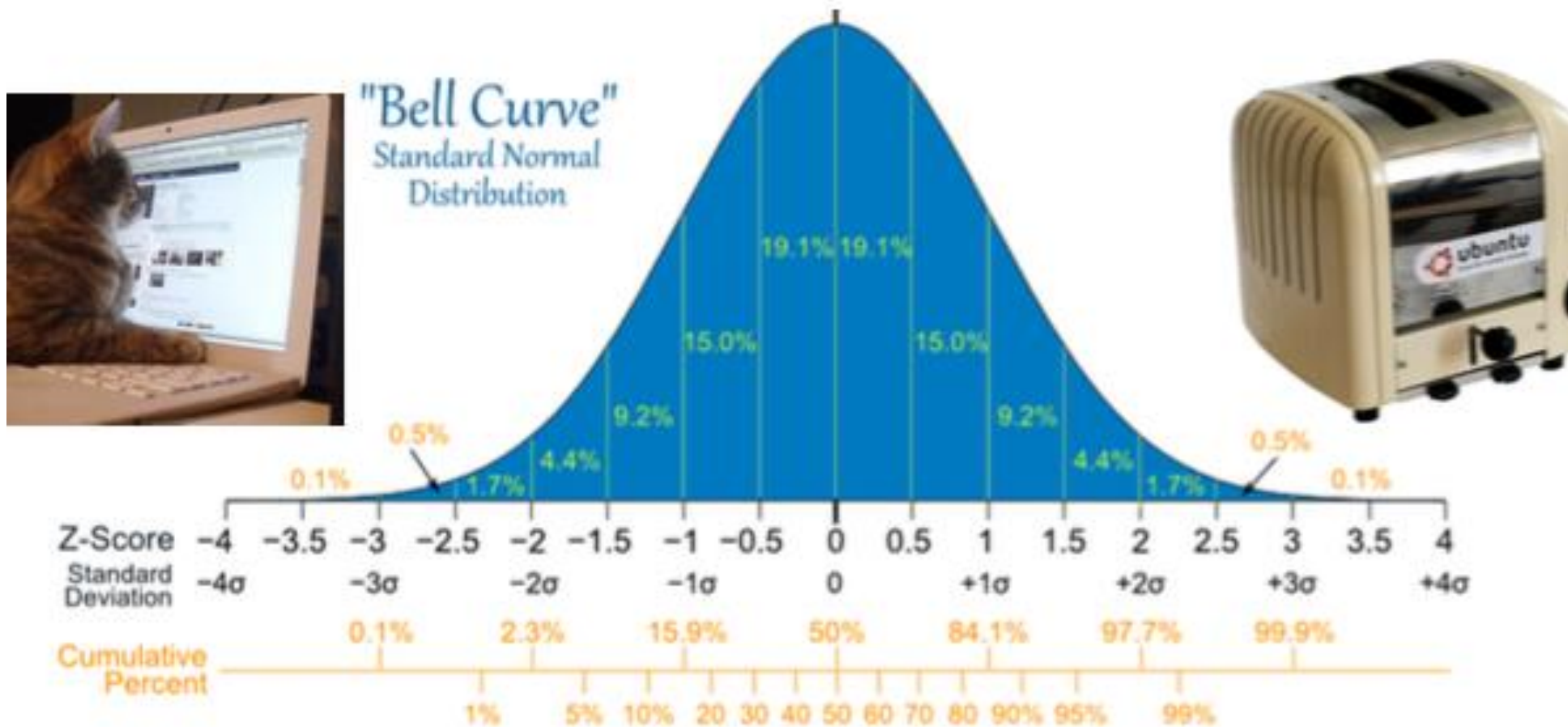
Checkpoint	marked	Deadline (Thu 5pm)*
1. Floating point numbers	Pass/Fail	Week 2 (soft)
2. Roots of quadratic	Pass/Fail	Week 3
3. Damped SHM plots	Pass/Fail	Week 4
4. How to write a computer program from scratch	Pass/Fail	Week 5
5. Projectile motion	Pass/Fail	Week 6
6. Monte Carlo method	Pass/Fail	Week 7

* Because the checkpoints are assessed in the lab, in practice *your* deadlines are the end of your timetabled lab sessions

Feedback and help

- You will receive feedback and help during the lab sessions
 - On your approach to programming
 - On your performance in the checkpoints
- This feedback is verbal and ‘real time’
 - Opportunity to discuss your work with a TA or member of staff
 - To help your understanding and to improve your next piece of work
- The checkpoints are assessed on a pass/fail basis only
 - This along the basis of “ungrading” philosophy to avoid you being over-assessed
 - To help you enjoy learning the skill of programming, not worrying about marks

Prior knowledge



Why learn scientific programming?

- Fundamental skill and tool in physics (and most science disciplines); hard to imagine physics research that does NOT use computing (and programming):
 - Simulation of physical systems (doing experiments on the computer)
 - Numerical solution of equations (only trivial equations can be solved by hand)
 - Data analysis (processing data from experiments)
 - Visualisation (see what is really happening)
 - Controlling equipment (automation makes experiments repeatable and faster)
- Anybody wanting to use computer beyond e-mail, web-surfing, social media, music / video NEEDS to be able to program; this is a good time to start!

Why learn scientific programming?

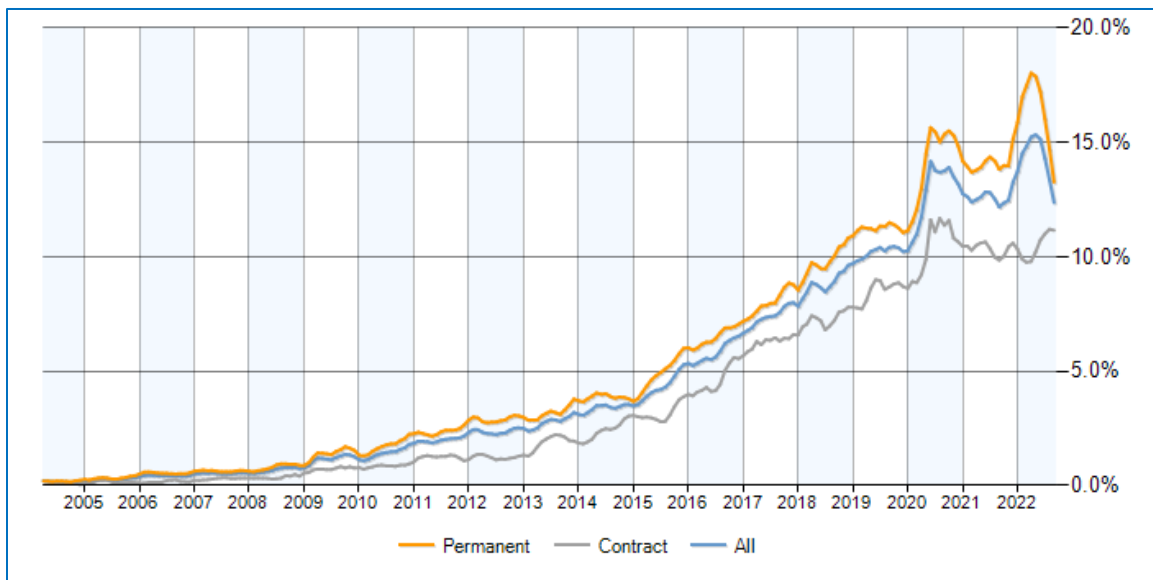


One of the essential skills in the technical job market

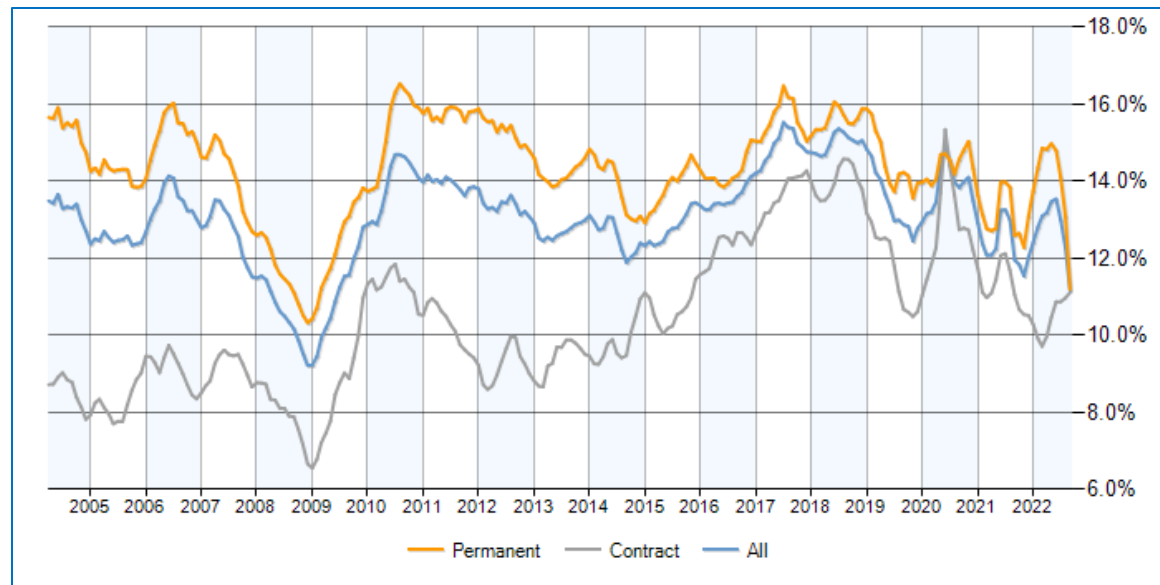
Why learn python?

- Easy to get started with simple constructs and forgiving syntax (you will write your first program in ~10 mins)
- Good foundation for more complex specialist languages
- Widely used in research (now more than 20,000 libraries)
- Often used to prototype algorithm / techniques and when proven converted to “faster” language for production use
- Taking off commercially...

Percentage of UK IT jobs advertised citing Python



Percentage of UK IT jobs advertised citing Java



Average starting salary in jobs citing Python

