Reflections on COMP2720 (Automating Tools for New Media)

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Outline

- Course overview
  (syllabus, topics, textbook, programming language and environment)
- Assessment
  (labs, homeworks, assignments, portfolio and examination, marks)
- Students
  (their degrees, year of study, experience and expectations)
- Reflections
  (the experience, what was good and what was bad, things to change and improve for next time)

Course overview

- COMP2720 is aimed at New Media Arts students
- Syllabus from ANU U/G handbook:
  "This course will introduce script-level programming in the context of New Media. Topics covered will include the nature of New Media applications, New Media data formats and data manipulation, program organisation, control structures, writing and debugging New Media programs."
- Proposed assessment from ANU U/G handbook:
  - Portfolio: 30% - creative/artistic part
  - Assignments: 40% - technical part
  - Final exam: 40%
- Prerequisites: COMP1100 or COMP1710

Topics (course modules)

- Introduction: why study computer science and media programming   [3 L]
- Pictures: RGB, pixels, loops, if .. then, drawing onto pictures   [9 L]
- Design and debugging: top-down, bottom-up, how to debug   [1 L]
- Sounds: sampling, loops – again, additive synthesis   [2 L]
- Text, files, network, HTML: Python standard library, strings, lists, urllib   [5 L]
- Visual Python: 3D animations, guest lecture Hugh – dinosaurs   [2 L]
- Computer science topics: Speed, complexity, functions, programming styles (object-oriented, functional)   [6 L]
- Python in the real world: Guest lectures *Ole Nielsen* (Geoscience Australia) and *Stuart Hungerford* (ANUSF)   [1 L]

Textbook

- Published December 2004
- Approach aimed at non-computer science students
- Includes JES software
- Several papers on their approach (ACM SIGCSE'05)
- Authors allowed me to use their slides

Introduction to COMPUTING AND PROGRAMMING IN PYTHON *A Multimedia Approach*

MARK GUZDIAL
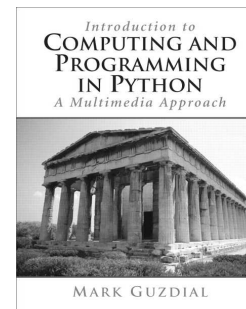
Programming language and environment

- Why Python
  - Interpreted (no compilation needed)
  - Clear and easy syntax
  - Procedural, object-oriented, as well as functional programming
  - Open source (many platforms)
  - Used in the real world (Google, NASA, Disney, ANU Viz lab, ATO, etc.)
  - 3D graphics module (Visual Python), large standard library
  - Good for file, text, string handling, and Internet access/processing
  - My language of choice (including research)
- Environment: *JES* (Jython Environment for Students)
  - *Jython* is Python implemented in Java

JES (Jython Environment for Students)

Program Area

Command Area
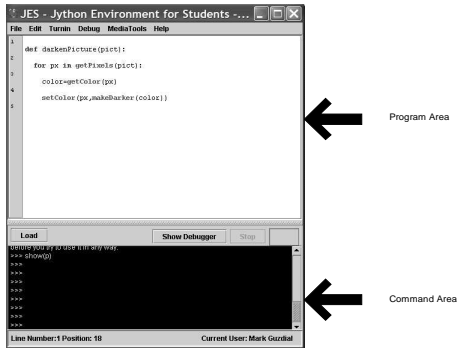
More on JES

- Besides full Python JES provides:
  - Functions for picture and sound manipulation
    pixel = getPixel(picture, x, y)
    setRed(pixel, redValue)
    sampleValue = getSampleValueAt(sound, index)

  - Functions to load and store JPG and WAV files
    picture = makePicture(fileName)
    writePictureTo(picture, fileName)
    sound = makeSound(fileName)

  - Functions to draw pictures
    canvas = makeEmptyPicture(width, height)
    addRect(canvas, x, y, width, height)
    addText(canvas, x, y, string)
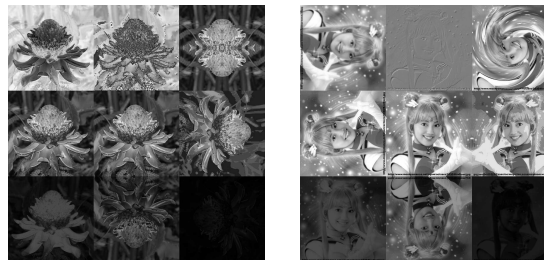

Example Python/JES program

- Convert a picture into greyscale:

```
def greyscale(picture):
  for pix in getPixels(picture):
    lum = (getRed(pix) + getGreen(pix) + getBlue(pix))/ 3
    setColor(pix, makeColor(lum, lum, lum))
```
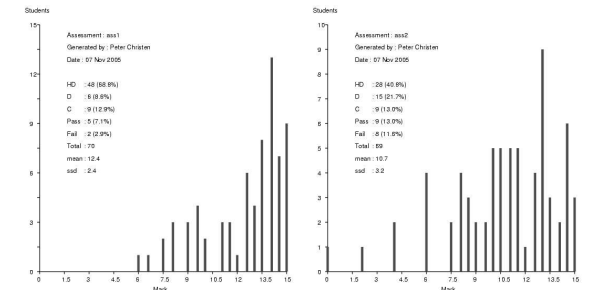

Course assessment

- Six supervised labs (12%)
  - Attendance 1 mark, workings 1 mark.
  - Additionally two home works (not directly marked).
- Two assignments (15% each)
  1 Create a picture collage (various manipulations).
  2 Create a HTML index page for images, sounds and HTML files.
- Portfolio (18%)
  - Create a Web page which includes all the lab and home work
    programs, media files (pictures, sounds, etc.) and descriptions.
  - Students were able to have a *technical* or *artistic* focus.
- Final examination (40%)
  - Written, 3 hours.
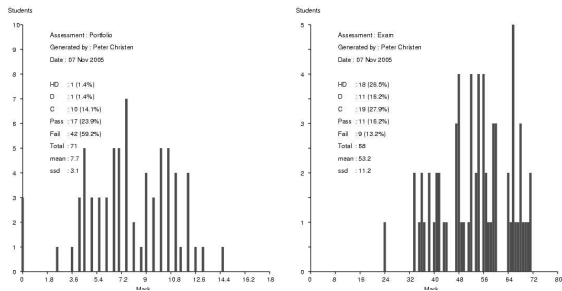

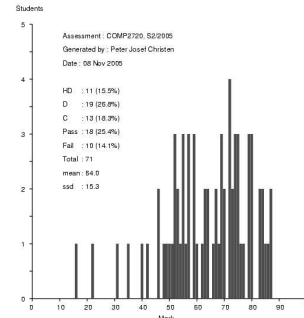
Example assignment 1 picture collages

See all at: http://cs.anu.edu.au/student/comp2720/assign/ass-1-gallery.php

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Assignment marks

Portfolio and exam marks

Students

Assessment : Portfolio
Generated by : Peter Christen
Date : 07 Nov 2005

HD : 1 (1.4%)
D : 1 (1.4%)
C : 10 (14.1%)
Pass : 17 (23.9%)
Fail : 42 (59.2%)
Total : 71
mean : 7.7
ssd : 3.1

Students

Assessment : Exam
Generated by : Peter Christen
Date : 07 Nov 2005

HD : 18 (26.5%)
D : 11 (16.2%)
C : 19 (27.9%)
Pass : 11 (16.2%)
Fail : 9 (13.2%)
Total : 68
mean : 53.2
ssd : 11.2

Final course marks (preliminary)

Students

Assessment : COMP2720, S2/2005
Generated by : Peter Josef Christen
Date : 08 Nov 2005

HD : 11 (15.5%)
D : 19 (26.8%)
C : 13 (18.3%)
Pass : 18 (25.4%)
Fail : 10 (14.1%)
Total : 71
mean : 54.0
ssd : 15.3

- HD: 11 (15.5%)
- D: 19 (26.8%)
- CR: 13 (18.3%)
- P: 18 (25.4%)
- PX: 4
- N/NCN: 6

Students

- In total 93 enrolments, 72 stayed and did the course.
- Analysis by degrees (from FAIS):
  - Digital Arts   3
  - BSc Science   2
  - InfTech-Eng   1
  - InfTech   40
  - SftWareEng   13
  - Exchange   1
  - Arts/IT   1
  - Comm/IT,Eng/IT 8
  - Unknown   3

More on students

- We did three questionnaires, plus CEDAM forms
  (*Entry* [53 responses], *Mid-term* [44], *End-of-semester* [32])
- Gender: 7 female, 47 male
- Semester of study: 24 in S2, 3 in S3, 7 in S4, and 17 in S6 or later
- Experiences:
  - All had some programming experience (mainly C/C++ or Java)
  - Python: 16 had never heard of it, 31 had heard of it, and 4 had used it.
  - Most had heard of or had used various media formats (JPG, GIF, WAV, HTML, CSS, etc.)

Comments from Entry questionnaire

- What do you expect to learn in COMP2720
  *"Create a good Web site", "Pearl, database, web apps",
  "More about design", "I expect to get better at snazzy Web
  development techniques", "Learn Python", "How to code and
  automate animations, video and graphics for the web or DVD".*
- Some other comments
  *"Please be easy on students", "Combines my interests in
  multimedia and programming",
  "I hate Java programming, I love HTML, I dislike all programming,
  I enjoy working with all media"* (BIT student, 2nd semester).

Mid-term questionnaire (done in labs)

- Lecture recordings: 19 used them, 25 didn't
- Question: "*So far COMP2720 has been...*"

	strongly agree	agree	neutral	disagree	strongly disagree
interesting	11	26	7		
useful	3	31	7	3	
what I expected	5	24	11	4	
too hard	2		14	19	9
too theoretical	1	2	14	16	11
fun	6	33	5		

- Some comments
  "Too much background in programming needed" (DA student),
  *"I enjoy Python – in comparison to Java it's awesome",
  "It would have been better if I'd done it in first year – this is not a
  2nd year course, though it makes a great later year bludge
  subject".*

End-of-semester questionnaire

- Lecture recordings: Never used by 16, sometimes used by 14, often by 2.
- Question: "*COMP2720 has been...*"

	strongly agree	agree	neutral	disagree	strongly disagree
interesting	12	17	3		
useful	6	18	7	1	
what I expected		17	10	5	
too hard	1	6	15	9	
too theoretical		3	13	14	1
fun	6	17	7	1	2

- Too much work in labs
- Not happy with JES (too slow, buggy)
- Lectures too similar to textbook
  (attendance was bad in 2nd half of semester)

End-of-semester questionnaire (2)

- Some comments
  "Lectures too slow"
  "Make it more new media oriented – it's too hard for new media students"
  "Too much content in labs"
  "Lecture room with better projector"
  "Assignments were enjoyable"
  "Python enjoyable language"
  "Best: learning some Python, worst: not learning enough Python"
  "Textbook was excellent choice"
  "Portfolio was a repetitive task"

Reflections

- Lectures
  Having a good textbook, recording, and slides online resulted in very low attendance rate (6 in one lecture!), pretty frustrating.
- Lecture slides
  Great to be able to use slides by textbook authors, but still a lot of work (adjust, modify, and correct).
- Textbook
  Very good to have one, but necessary to always read ahead.
- Portfolio (creative work)
  Was supposed to be a collection of all labs and home works, done during semester – but most students waited until last week.

Reflections (2)

- Programming environment (JES)
  Good to learn programming for absolute beginners, but for students with prior experience too slow (and buggy). (New version should become available by next year.)
- Python
  Almost all student enjoyed it (one single negative response - without explanation), mainly due to clear syntax, not much overhead, interpretation (no compilation needed), usefulness, versatility, etc.
- Overall
  My first 'new' course, very high workload, but interesting...

Summary

- Interesting new course
  - Could become *"Introduction to computing"* for everybody.
- Mainly positive feedback from students.
  - Despite large variety in student background.
- Has been interesting, but a very high workload.
- Needs to be advertised properly.
  - To our students.
  - In general on campus.