

Making the Move to Python

Education Track

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Background Information

- Year 1 common module – Mathematics and Computing Concepts
 - 2 semesters, mixing Math + programming
 - Compulsory for all students
- Student response – mixed to poor
 - Did not serve a effective foundation for IT or Engineering students
 - Generally negative attitude to programming

What were the problems faced ?

- Visual Basic: industrial-strength programming language
- Visual Studio: professional development environment
 - *Automate and hide* as much as possible
 - Manage projects professionally
 - Provide as many tools as possible
- Learning issues:
 - Visual Studio does many things *automagically*
 - Starting with events and handlers (Windows Forms) in VB is *not a good idea!*
 - Use professional tools when ready

Fine-tuning of Year 1

- Separate Math modules
- One-semester introductory programming module for IT, Engineering and other students (not all students)
 - Chance to create a true “CS101” (at polytechnic level)
 - Smoother transition to Object Oriented Programming or Embedded Systems Programming

Python: Zero to 2000+ in a single bound?

- No!
- Initial trials at schools (2007)
 - Enrichment modules for secondary school students
 - Special module for IP students from a JC
 - Very positive results
- Python for Digital Media diploma students (2008)
 - Year 2
 - Java *less useful* for digital media industry
 - Start with the toughest nut?
- C105 Introduction to Programming (2009)

Considerations for Introductory Programming

- Sensitive to *beginners difficulties*
 - *Language Syntax*
 - *Semantics*
 - *Conceptual Models*
 - *Problem solving*
- Look for best of breed approaches and tools
 - RUR-PLE (robot environment, Roberge)
 - Turtlegraphics (Papert et al)
 - pygame
 - PIL

Why Python?

- Simple and Clean Syntax

print "Hello World"

- Readability

Indentation in Python programs helps to structure the code and makes it easier to read

- Immediate Feedback

Interpreter allows demonstration and experimentation and feedbacks right away

- Rich Set of Libraries

Initial Trials

- Develop an enrichment module, “ Games Design & Programming” for secondary school/JC students.
- Objectives
 - Introduce programming as a fun and useful activity.
 - Help students develop basic skills and knowledge in programming
 - Have students apply their skills and knowledge to create a simple game



Start simple, start fun

```
1 def turn_right():
2     ...turn_left()
3     ...turn_left()
4     ...turn_left()
5
6 while 1:
7     ...if front_is_clear():
8         ...move()
9     ...else:
10        ...turn_left()
11
12
```

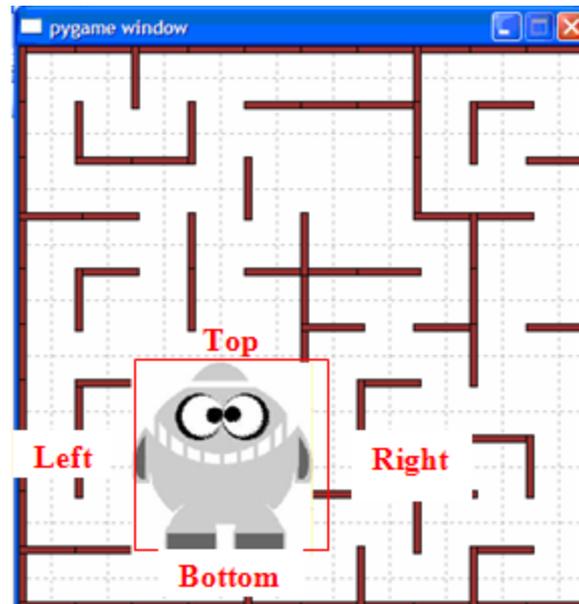
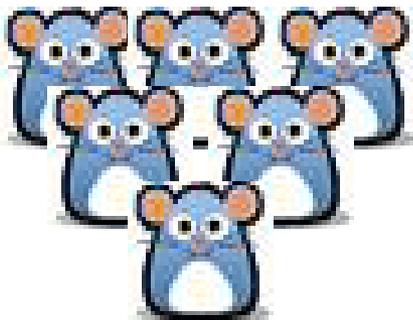
The maze is a 10x10 grid with a robot at (1, 5) and a goal '1' at (10, 10). The maze walls are represented by thick red lines. The y-axis is labeled 'Street' and ranges from 1 to 10.

Pick up ideas on sequence, selection, iterations, functions and some algorithmic thinking to achieve the mission of getting Reeborg out of the Maze.

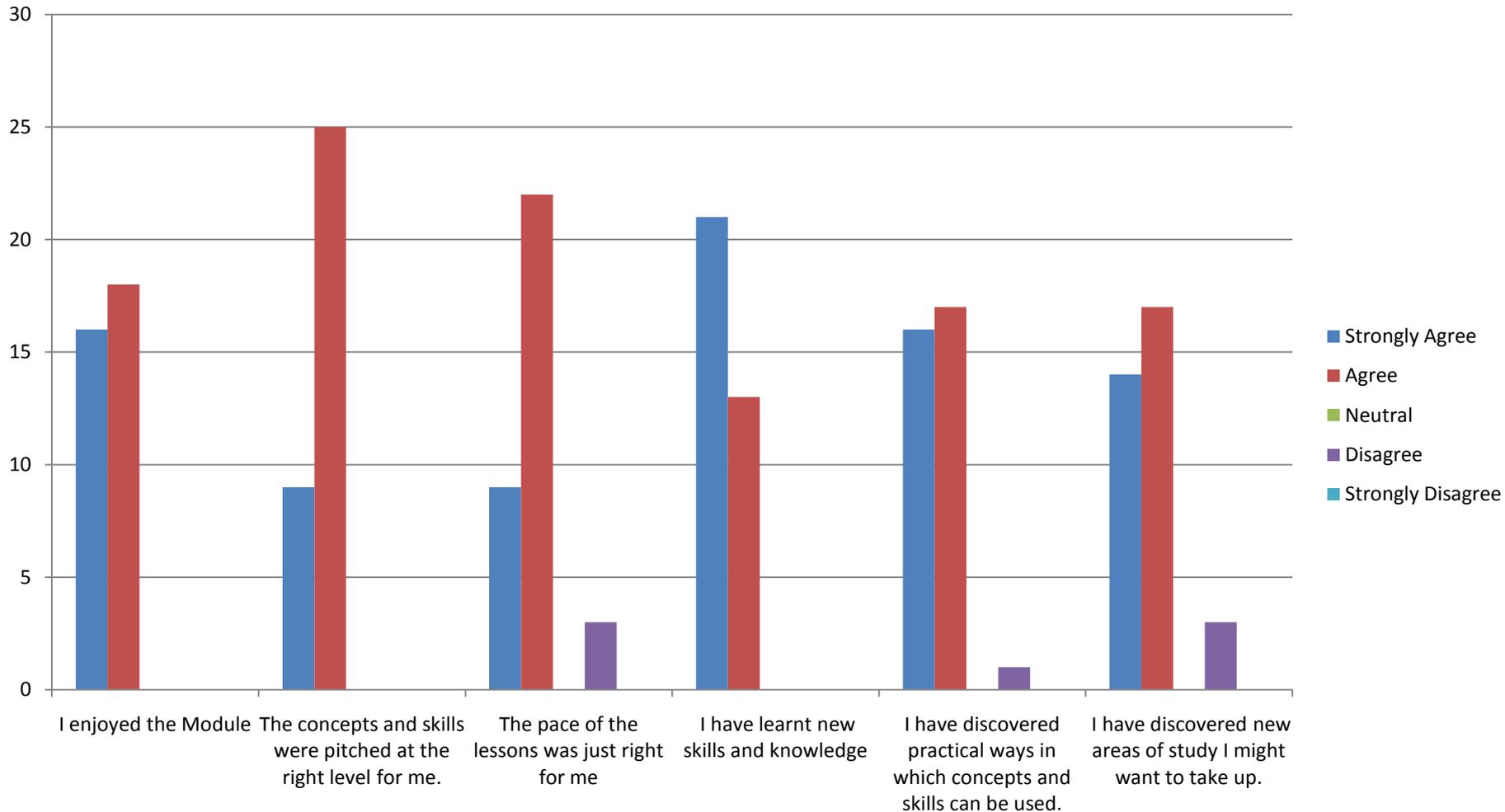
Next move on to create stuff..



Make Your Own Pet Robot class
Gotta move it and keep within the screen
Make “things” happen
Add sight and sound effects!



Student Survey Feedback



What did students say....

“The pace of learning is great. We get to try a lot of things. Finally, it lets us create a game of our own, from absolutely nothing. Challenging.”

“The lessons and hands-on work are interesting and fun. I am able to understand the concepts easily. The lecturers are friendly and teaches well”

“Everything, especially the fact that the fruits of your labour can be seen instantly, unlike other courses.”

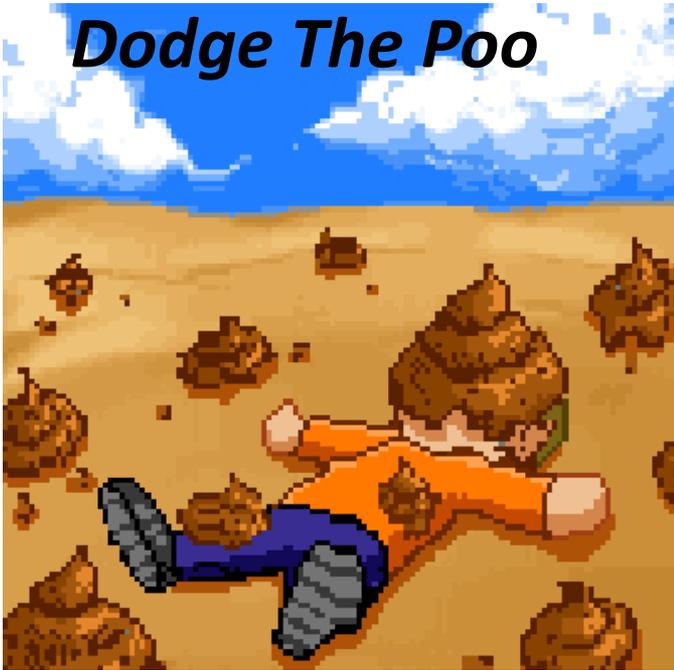
“I like this AEM course as after we have finished making our game, we get to share with other students.”

“It has been an enjoyable experience. The teachers are very helpful and enlightening. I have managed to make a fun game and realised that I have a passion for it.”

It teach me to create a simple game. At first it was difficult but came to ending, it was fun to play our own game.

Games that students created..

Dodge The Poo



Demo

Python for Digital Media diploma students

- Year 2, Digital Media diploma students learn Python.
- Students from other IT diplomas learn Java.
- The pair of modules cover a common set of learning objectives that include object oriented programming.
- Results: The Python group had moderately better attendance rate and lower failure rate compared to the Java group.

Moving to Python: Results?

- Student performance: generally similar, but stronger grounding
- Much improved *attitude and motivation*
- Transition to Java – concepts can be transferred (Python can be used as pseudo-code)
- Transition to Python OOP - good.

Moving to Python: Lessons

- Don't re-invent. Someone smarter has probably already done it!
- Learn from other educators.
- Invest in staff training.
- Work the “open source” way.
 - Share
 - Collaborate
 - Think different
 - All schools collaborating + community help = recipe for success