IS12 - Introduction to Programming

Lecture 1: Introduction

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Outline

- Introduction to course goals and content
  - Books
  - Tools
- What is programming?
- Introduction to Karel the Robot
  - The Karel programming environment
  - Creating words
  - Writing programs
IS12 and BSIS

- Information Science and programming
- So, do we need to learn a programming language?
  - To understand it, you have to do it!
  - No magic in programming!
- BSIS: need 2 programming courses
  - IS12 ⇒ IS15 ⇒ IS18 ⇒ IS20

What is special for IS12?

- 1/3 of BSIS students fail IS15
- Most courses offer a steep introduction
- Gentle introduction for the beginners
- Prepares for IS15, IS18, and IS20
- Languages:
  - Karel the Robot (1/4 of the course)
  - Introduction to C (3/4 of the course)
- Is it the right course for you?
Learning programming

- **Catch up early!**
  - Get books, check/use Web tools, install and get yourself familiar with programming environments

- **Practice, practice, practice!**
  - Run all examples, modify it, explore
  - Check yourself on quizzes
  - Solve problems and exercises

- **Get help!**
  - Ask questions in CourseWeb forums
  - Meet TAs and your instructor during office hours and by appointment

Books

- **Books for Karel the Robot**
  - Pattis
  - Online tutorial

- **Books for C**
  - Perry: Absolute Beginner’s Guide to C
  - Others
    - Kernighan and Ritchie
    - Deitel and Deitel
  - Multiple free tutorials on the Web. You will be able to access them via Knowledge Sea system
Course Tools

- All information will be provided via course Web site
  http://www2.sis.pitt.edu/~peterb/0012-051/

- The complete list of tools is provided on Tools section of this site

- Blackboard system will be used as the main learning support tool

- Karel the Robot environment will be used for programming

- Other tools will be introduced later

Blackboard (CourseWeb)

- Blackboard system will be used for:
  - Posting announcements (WATCH IT!)
  - Posting course materials, assignments, and quizzes
  - Learning about and communicating with each other
  - Asking questions and getting answers
  - Submitting assignments
  - Posting grades
Communication

To you
- Watch closely the CourseWeb site for announcements.
- Check your Pitt mail (xyz@pitt.edu) connected to CourseWeb regularly - most important and urgent information will be distributed by e-mail

From you
- If a question is not personal (an answer could be useful for others) - *ask via forum*
- If it is a personal question - ask me or TA by e-mail (can do it from CourseWeb too)

Office Hours

CourseWeb Assignment (HW1)

- Due Thursday 9/2/03
- Try visible features, ask questions, answer questions
- Home page (*picture!*) - up to 4pts
- Complete a Pre-test - results are not counted towards your grade (1pt)
- Search the Web, find a programming course that uses Karel or a similar language, post URL and a message to the test forum (1pt)
What are computers (robots)?

- “idiot servants” that can do simple operations incredibly fast if you tell them every step to do
- like little children in their need for specific and detailed instruction
- computers are not “brains” & are not “smart” - they only as good as the program they are running

How to give commands?

- Dialog mode:
  - Give a command
  - Observe results
  - Give another command
  - Observe results … …

- Programming:
  - Give a set of commands in advance
  - Observe final results
Programs and programming

- What is a program?
  - A set of instructions given to a computer to working with objects (world, data) designed to accomplish a specific task

- What is programming
  - The art to control these “robots”, “servants”, “little children” by writing sets of instructions in advance
  - The art and craft of writing programs

Karel the Robot

- Invented by Richard Pattis in 1981
- A Gentle Introduction into Programming
- Used in top universities and colleges
- Learning to program by learning to control Robot Karel acting in its World
  - Learn basic principles of programming
  - Learn main programming constructs (same in Karel, C, Java, Pascal, Basic, etc)
Karel’s world

- Horizontal Streets
- Vertical Avenues
- Corners (Intersections)
- Beepers situated at corners
- Walls separating corners
- Robot Karel
  - may stand in any corner
  - can face North, South, West or East

Creating a New World

- Use tab Initial World in the environment
- Push New to create a new empty world
- Move cursor and use world editing tools
  - To place walls
  - To place beepers
  - To position Karel
- Save the world to a file for the future re-use (use .kw extension)
Get out of Jail Problem

- Get Karel out of Jail!

Start:

Target:

Get out of Jail Program

beginning-of-program
  beginning-of-execution
    move;
    move;
    turnleft;
    move;
    turnoff;
  end-of-execution
end-of-program
Now what?

- Go to “Program” tab
  - Create new program
  - Write/Edit program
  - Compile program
- Go to “Execute”
  - Initialize execution
  - Run program
- The robot will execute the current program in the current world

Before next lecture:

- Read Syllabus carefully!
- Try IS12 Web site
- Install / try Karel Environment
- Get / check the books
- Reading assignment:
  - Pattis, Chapter 1,
  - Tutorial Lessons 1 and 2
  - Answer questions from Chapter 1
- Create and save four worlds from the problem 1.4.5 in Pattis book