GENERAL INTRODUCTION TO PROGRAMMING (2 CREDITS)

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Course Number: 2120-1006-05 (First Session, June 17 - July 16, 2015)

Computers and computer communication have experienced a revolution in the last 30 years. Following this technological revolution, computers are widely used in most modern societies, and in fact society itself has been changed in many non-technological aspects. Most users of computers and powerful processors (e.g. in smart phones) are not aware at all of what happens "under the hood".
In this course, we will introduce some of the elegant concepts and ideas underlying Computer Science. We will demonstrate course topics using a modern programming language called Python.

Please note: Computer Science majors may not register for this course.

Course topics (this is a suggested list, may change over the semester):

1. Python programming language: variables, conditionals and loops, lists and strings, functions
2. Basic algorithms (e.g. search, sort, merge) and the notion of complexity
3. Recursive algorithms
4. Introduction to cryptography: substitution ciphers and distribution of letters in natural languages, the Diffie-Hellman protocol.
5. Intractability and the P vs. NP open problem
6. Un-decidability and the halting problem
7. Error detection and correction codes: repetition and parity bit
8. Digital images: synthetic images, basic image processing

Recommended Reading:

1. Python 3 documentation, http://docs.python.org/py3k/, is the official language manual, and a very useful resource.
2. Think Python, by Allen B. Downey, which is available online.
3. A book by John Zelle, Python programming: an introduction to computer science:, second edition. Fraklin, Beedle & Associates.
4. Algorithmics, David Harel, the Open University

Grade: a major part of the grade will be based on a final exam or project, and a minor part on HW assignments (including "wet" programming).