COMPUTER SCIENCE 1026A

COMPUTER SCIENCE
FUNDAMENTALS

Notes adapted from Introduction to Computing and Programming with Java: A Multimedia Approach by M. Guzdial and B. Ericson, And instructor materials prepared by B. Ericson.
Instructor

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Why take this course?

- Learn how to solve real world problems using computers
- Amazing job prospects
- Because it can change the world – this business is binary, you're a 1 or a 0
Real World Problems

• Research in computer science is used to study and help solve real world problems such as:
  – Cancer (Jenna Cameron)
  – Storing the Genome (Beth Locke)
  – Keep distributed systems low energy to combat global warming (Hanan Lutfiyya)

• Also used to work on fun problems:
  – Video game development (Mike Katchabaw)
  – Computer Vision (good for robotics and army) (Yuri Boykov)
  – DNA Computing (Lila Kari)

The people in brackets are actual people at UWO working on these projects. A degree in Computer Science would prepare you to work on any of these kind of amazing projects!
Cancer

- Curing cancer one click at a time
- Computer scientist A.R.A Anderson has worked for over 10 years studying cancer using computers
  - He modeled the way cancer spreads in the body
  - Jenna’s thesis project is on expanding his work to more accurately represent what happens in the body
Cancer

- Models predict when and where a tumour will spread.
- Can predict prognoses, and more importantly, what treatment would work best.
Job Prospects

Percentage Of New STEM Jobs By Area Through 2018

- Computing: 71%
- Physical Sciences: 7%
- Traditional Engineering: 16%
- Mathematics: 2%
- Life Sciences: 4%
- Computer Networking: 21%
- Software Engineering: 27%
- Database Admin.: 2%
- Systems Analysis: 10%
- Computer Support: 7%
- Other Computing: 3%
- CS/IS Research: 1%


Figure 2. Undergraduate CS Degree Enrollments

Source: CRA Taulbee Survey

Total, left scale

Median per dept., right scale
Job Prospects

Annual STEM Job Openings vs College Graduates Through 2018

Change the World

• Think of what the world must have been like before 2 college students created Google

• Can you imagine a world without cell phones, iPods or cars?

• Almost everything we interact with now has a computer in it — and a computer scientist dreamed it up!
If you were going to try to cure cancer, what types of things would you think about?
Back to cancer...

- Body, organ, cell → Objects
- Grow, eat, divide → Methods
- How big? How many cells? How old are the cells? How old is the body? What organ? → Attributes
- We learn how to turn a simple list like this of things, actions and attributes into a full computer program by the end of this course!
Course description

CS1026 is an introduction to the basic concepts of computer programming and program design using

- a multimedia approach
  - images
  - sound
- problem solving
- the programming language Java
Who is this course for?

- **No prerequisites**
  - But previous programming experience helps
- **It is an introduction to programming**
  - For students who intend to go on into Computer Science
  - For students who want to gain some expertise in Java programming
- **It is not an easy course**
- **Not for students with significant background in computer programming**
Textbook

Introduction to Computing and Programming with Java: A Multimedia Approach, by Guzdial and Ericson
The course website

- [http://www.csd.uwo.ca/courses/CS1026b](http://www.csd.uwo.ca/courses/CS1026b)

Contains course related information:

- lecture notes
- lab instructions
- assignments
- links to other sites
- sample code

Check it frequently for announcements
Lecture notes

- Available from the CS1026b website
- They are copies of the slides used in class, and are intended to help in note-taking during lectures
- They are NOT a substitute for attending lectures
Labs

- 2 lab hours per week, in computer lab in Middlesex College
- Labs start week of Jan 17.
- Purpose of labs: guided, hands-on experience with Java programming
- Labs are mandatory and graded
- Lab instructions will be posted on the course website
  - Read through the lab instructions before coming to the lab.
  - Do the pre-lab preparation.
  - First lab: bring a printed copy of the lab instructions to the lab.
Computing environment

- The computers in our First Year Teaching Environment (FYTE) run under Windows.

- To use our computer labs, you need:
  - **Username**: your uwo email username
  - **Password**: emailed to your uwo email address
  - You will need your password for the first lab, so make sure you read your uwo email before your first lab session.
Summary

• A degree in computer science can take you just about anywhere – from the world of video games to curing disease

• This course will prepare you to start an undergrad degree in computer science

• By the end of this course you will be able to read and write computer code, and think like a computer scientist

Get ready for a great course!