ALGONQUIN COLLEGE

OVERVIEW OF PC AND JAVA

Where can you find out how your final grade will be calculated?

A From your classmates

B From the department

C In Brightspace somewhere

D From the Course Outline

E None of the above

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Have you successfully connected to the college wireless network with your laptop?

A Yes

B No

Have you successfully connected to the college wireless network with your laptop?

A Yes

B No

Have you been able to print in the college using the printers?

A Yes

B No

Have you been able to print in the college using the printers?

A Yes

B No

Which of the following courses do you think will be your most difficult courses

A CST8101 - Computer Essentials

B ENL1813t – Communications 1

C CST8110 - Intro to Computer Programming

D CST8215 - Database

E CST8300 - Achieving Success

F MAT8001 - Mathematics

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During the fall my Academic Advisor is…

A Carolyn MacIsaac

B Howard Rosenblum

C Linda Crane

D Todd Kelley

During the fall my Academic Advisor is…

A Carolyn MacIsaac – T307f

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I have looked at the information in the CST8110 Brightspace course

A Yes

B No

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A Yes

B No

Which of the following best describes you?

A I have never written a program before

B I have done some programming – but not using Java

C I have programmed in Java before

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CST8110

- Hardware
- Software
- Overview of Java

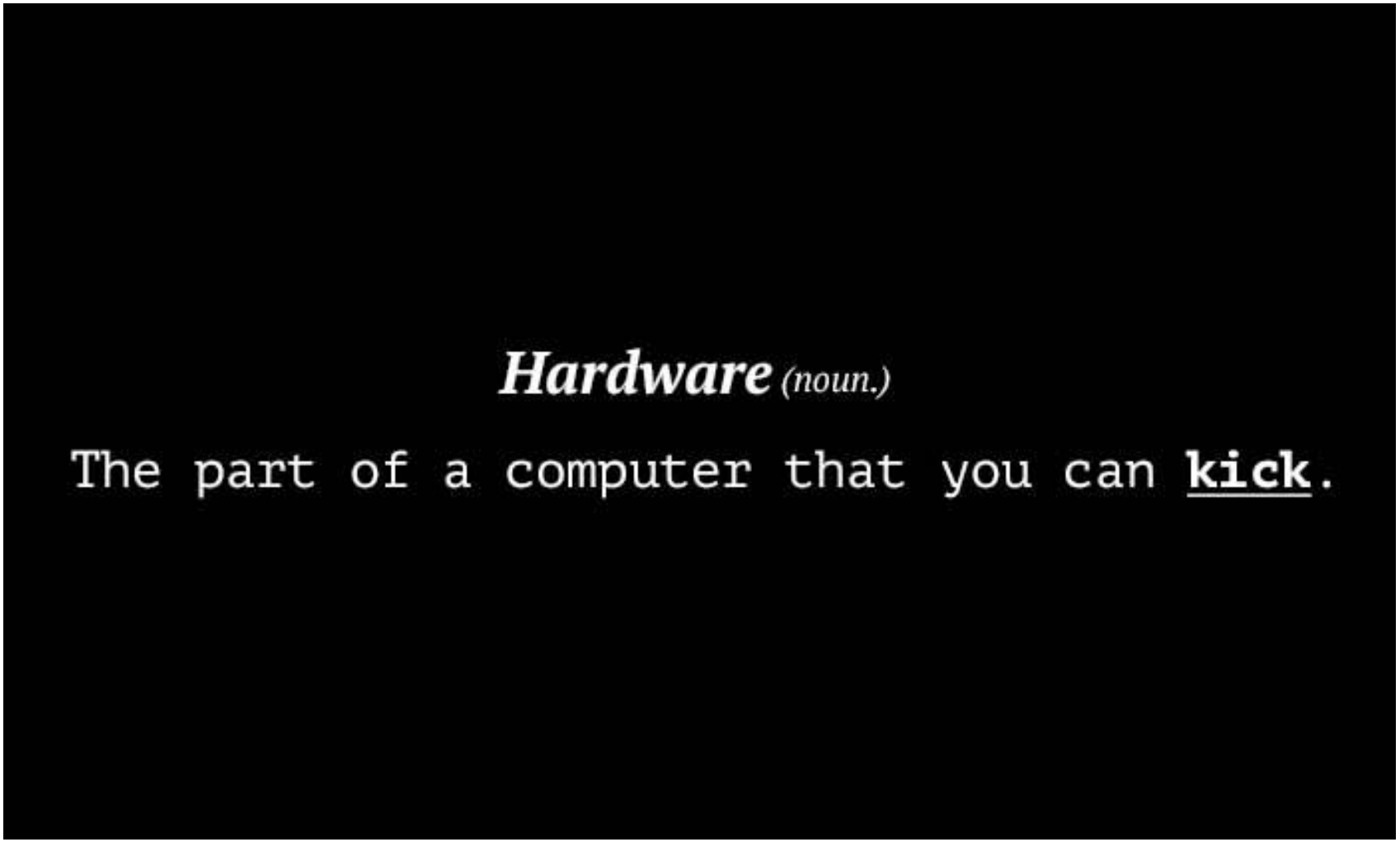
Hardware

- physical components of computer
- perform capability to
  - accept input
  - display output
  - store information
  - perform arithmetic and logic operations
  - direct overall operation of system

Hardware

- Memory - stores information
  - RAM and ROM
- CPU (Central Processing Unit)
  - Control Unit - directs operation of computer
  - Arithmetic/Logic Unit - ALU - performs arithmetic and logic
- Input/Output Unit - provides access to and from computer
- Storage - Hard drive, memory stick and CD-ROMs

In short…



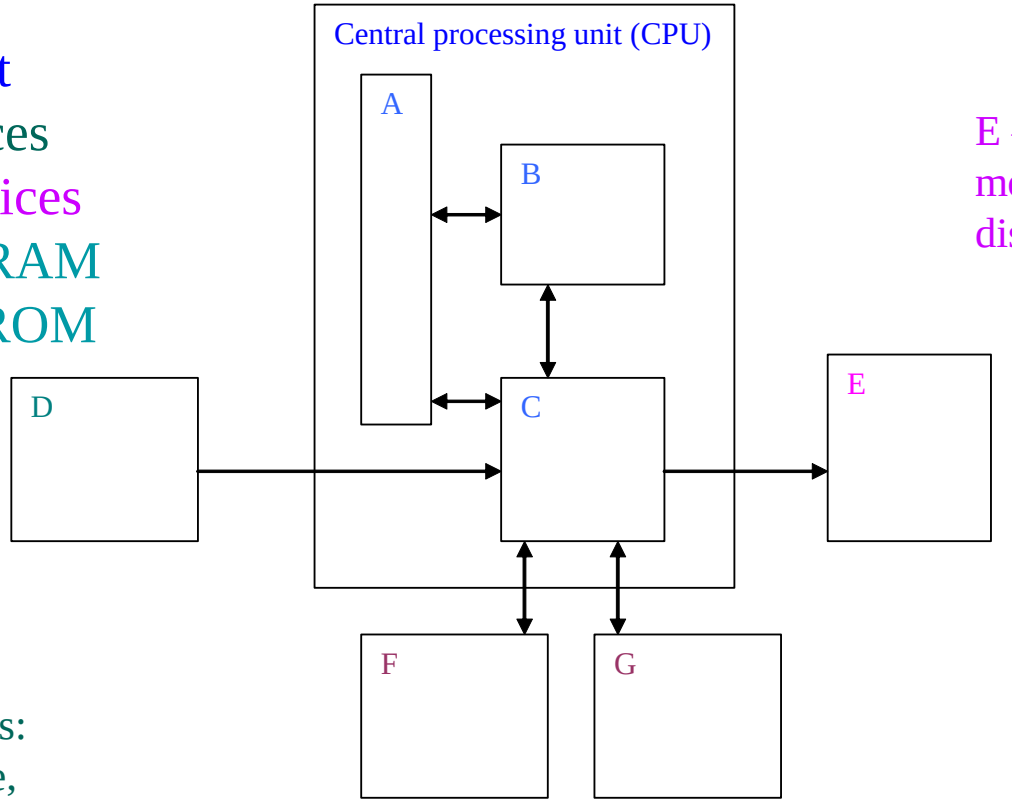
http://www.hongkiat.com/blog/programming-jokes/

Von Neumann Computer

- Von Neumann came up with the concept of the stored program
- Everything in memory is data – but when it arrives at the processor it is determined if is “input data” or “program instruction”
- This led to today’s microprocessors

Von Neumann computer

A – registers
B – ALU
C – control unit
D – input devices
E – Output devices
F – memory - RAM
G – memory -ROM



E – output devices:
monitor, printer,
disk, CD/DVD, etc.

D – input devices:
keyboard, mouse,
disk, CD/DVD, etc.

Software

- set of instructions used to control operations of computer
- written in different languages
  - machine language - understood by computer
  - assembly language - one step better
  - high level language - English like - C++/Java -
    - need to be compiled or interpreted - translated into machine language ()

Useful videos

- Compiler - https://www.youtube.com/watch?v=_C5AHaS1mOA
- High level languages - https://www.youtube.com/watch?v=kil2Z3ij-JA
- Full program - https://www.youtube.com/watch?v=3XaCmr2y6rM

Programmers & Programming

- Any fool can write code that a computer can understand. Good programmers write code that humans can understand. ~Martin Fowler

- I really hate this darn machine;
  I wish that they would sell it.
  It won't do what I want it to,
  but only what I tell it.
  ~Author Unknown

- The magic of myth and legend has come true in our time. One types the correct incantation on a keyboard, and a display screen comes to life, showing things that never were nor could be.... The computer resembles the magic of legend in this respect, too. If one character, one pause, of the incantation is not strictly in proper form, the magic doesn't work. Human beings are not accustomed to being perfect, and few areas of human activity demand it. Adjusting to the requirement for perfection is, I think, the most difficult part of learning to program. ~Frederick Brooks

http://slideplayer.com/slide/10111818/

Overview of Program Execution

- Program is loaded from some external device (hard drive, floppy, etc)
- Program is stored in memory (RAM)
- In microprocessor is the Program Counter – starting address of program
- Program will manipulate RAM according to its interpretation each instruction
- Executes one instruction at a time

http://www.youtube.com/watch?v=C3dLwtwdEjM

Development Cycle for Java

- Step 1 - Editor
  - Type in our instructions/statements according to rules of Java Language
  - File from editor is called a source file and will have extension **.java**
- Step 2 - Compiler
  - Use compiler to translate the statements in source file to bytecode (which are portable – not dependent on hardware platform)
  - File from compiler is called bytecode file and will have extension **.class**
  - Use command> `javac ProgramName.java`
- Step 3 – Loader
  - Use class loader to load bytecode files into memory (includes all the .class files that you have written/produced and those provided by Java that you are using)
  - Use command> `java ProgramName` to invoke Loader, Verification, Execution
- Step 4 – Bytecode verification
  - Use bytecode verifier to ensure bytecodes are valid and do not violate Java's security restrictions
- Step 5 – Execution
  - Use JVM (Java Virtual Machine) to execute program's bytecodes (to perform the actions specfied by your program)

Advantages of Java

- Portable “byte code” – write once, run anywhere
- Standardized language
- Type-safe language
- Secure environment (…compilers catch more errors)

Disadvantages of Java

- Can be slower than native machine code compiled languages due to interpretation of byte-code
- Relatively young language, still undergoing changes (although mostly updates and additions – basics haven’t changed in awhile)

Sample Java Class

```
import java.lang.*;                    //all import statements must be first
/**  Illustrating how to write a simple java class and how to
  *   write a main function in Java
  *   @version 1
  *   @see java.lang.String
  */
class JavaMain {
    public static void main (String[] argv) {
            int stringLength = argv.length;
            if (stringLength == 0)
               System.out.print ("\nWho Loves Java: ?");
            else
               System.out.print ("\n" + argv[0] + " Loves Java: ");
    } // end of main
}// end of class
```

General Java Notes

- Everything in Java is case sensitive…even filenames!
  - Javamain is not same as JavaMain is not same as javamain
- Statements end in ;
- Comments – ignored by java compiler:
  - // means ignore to end of line
  - /* means ignore until you hit */
  - /** special comment used to generate documentation */
- Blocks are bounded by { }
- Must have one and only one…

  public static void main ( ) { }

General Java Notes

- ERRORs…..How do they show up???? Can be misleading, but thinking about how a compiler would detect them can help…

Using Java at Command Line

- Select Start….Run…..enter cmd to get into command line mode
- Prompt should be C:\Documents and Settings>
- Change directory to where .java source file is

  C:\Documents and Settings> cd c:\temp

  Note….cd is the command for "change directory"

  Note > dir c:\temp dir is the command for "display directory contents"

Using Java at Command Line

- To compile:

  C:\temp> javac JavaMain.java

- To execute:

  C:\temp> java JavaMain

You should now know

- The basics of hardware
- What is software
- The difference between Compiler and Interpreter
- Development of Java program
- Steps to compile on command line