Computer programming

Spreadsheet

Database

CPSC 203

Introduction to practical problem solving

(James Tam)

Images:
Colourbox.com

Administrative (James Tam)

- Contact Information
  - Office: ICT 707
  - Email: tam@ucalgary.ca
  - Make sure you specify the course name and number in the subject line of the email 'CPSC 203'
- Office hours
  - Office hours: T: 14:00 - 14:50, R: 16:45 - 17:15
  - If I'm not in my office give me a few minutes or check the lecture room.

My Office

Images: courtesy of James Tam

Course Resources

- Required resources:
  - Course website: http://www.cpsc.ucalgary.ca/~tamj/2016/203F (You must get the slides off the course webpage before lecture)
- Online course textbook (recommended but not a mandatory purchases).
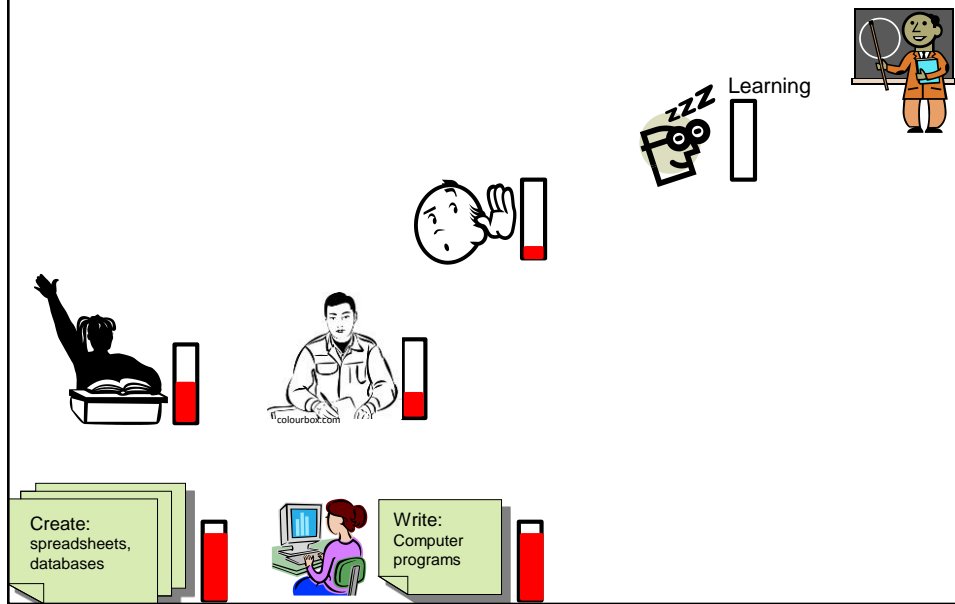 - Helpful for some tougher topics especially MS-Access, VBA programming
  - The code can be purchased through the cashier or online: www.calgarybookstore.ca.

How To Use The Course Resources

- They are provided to support and supplement this class.
  - The notes outline the topics to be covered
  - *At a minimum* look through the notes to see the important topics.
  - However the notes are just an outline and just looking at them without coming to class isn't sufficient to do well
  - You will get additional details (e.g., explanations) during lecture time
    - Take notes!
    - If you miss a lecture then get a copy of the in-class notes from another student (who takes detailed notes)

Your Engagement Level -±-> Your Learning

Learning

Create:
spreadsheets,
databases

Write:
Computer
programs

colourbox.com

Tam's "House Rules"

- I always endeavor to keep the lecture within the prescribed time boundaries
- You won't pack up and leave before time is up

Tam's "House Rules"

- No recordings/captures without permission during class please

- (Recall that learning tends to increase with additional levels of engagement).

Colourbox.com

Tam's "House Rules"

- Quiet whispering is OK…

…but make sure if it is *quiet*. If it's loud enough for me to hear then it's likely that others are being disturbed by the noise as well.
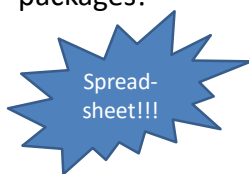
Images from
colourbox.com

Learning Objectives

- Main student outcomes:
  - Look at an expression such as a spreadsheet formula, a database query or a computer program and determine the outcome or results derived.
  - Write an expression in order to solve a problem that you have not encountered previously (although it may although it may be similar).
- Secondary student outcomes:
  - Apply logical and other operators employed by a search engine in order to narrow down search results in order to find the needed information.
  - Understand the computer technical specifications taught in class in order to perform a rudimentary evaluation of a list of specifications that may be included in an actual computer advertisement.
  - Describe common technical concepts so that students can demonstrate a rudimentary level of computer literacy.

Practical Course Outcomes

- You get to learn 3! Count 'em 3 commonly used software packages!

  Spread-sheet!!!

  Data-base!!!

  Advanced word processing!!!

- But wait-there's more!!!

  SALE!!!

Practical Course Outcomes (2)

- Employer XYZ wants to hire an Access © database developer or someone familiar with SQL queries now.
- This is what's hot, hot, hot

- But what's hot today may not look so good tomorrow

- Technology changes: get used to it

Practical Course Outcomes (3)

- You will not only learn how to use existing technologies (spreadsheet, database, word processor) but also how to problem solve and create your own new software.
- Problem solving is required in the programming component: VBA office macros or augmenting a web page by writing supplementary software.
- Some corporations have recognized the relationship between problem solving skills and success in the work world:
  - E.g., "Killer" interview questions
    - **Google**
    - http://www.businessinsider.com/15-google-interview-questions-that-will-make-you-feel-stupid-2009-11?op=1
    - **Apple**
    - http://www.businessinsider.com/apple-interview-questions-2011-5#how-do-you-test-the-prototype-of-the-vending-machine-5

Evaluation Components

- Assignments
- Examinations
- In class bonus quiz questions

Assignments (Proportion Of Term Grade 40/100)

- (Partial) A1: Advanced word processing features (Word): *5% proportion of term grade*
- A2: Spreadsheet (Excel): *10% proportion of term grade*
- A3: Database (Access): *10% proportion of term grade*
- A4: Program writing: *10% proportion of term grade*
- (Partial) A5: Creating a webpage using html tags: *5% proportion of term grade*

Assignments

- Assignments must be individually completed and individually submitted.
  - There is no group work allowed for this class.
  - Students **should not** see the assignment solutions produced by other students.
- Assignments will be marked by the tutorial instructor.
  - Grades will be posted in D2L
  - You can contact him/her for the grade and/or the completed marking sheet.
  - If you still have questions or issues after contacting your TA then feel free to contact your course instructor.

Submitting Assignments

- **Bottom line: it is each student's responsibility to make sure that the correct version of the program was submitted on time.**
- Late assignments will not be accepted.
- If you are ill then medical documentation is required.
  - Contact your **course instructor** and not your tutorial instructor to get permission for a late submission

I am the 'course instructor' person

- (Further details will be available during the term).

JT's Helpful Hint: Electronically Submitting Work

- Bad things sometimes happen!
  - Sometimes it's a technical failure (e.g., hardware failure)
  - Sometimes it's human error (e.g., oops, accidentally deleted)
- Rules of thumb for assignment submissions:
  - Do it early! (Get familiar with the system)
  - Do it often! (If somehow real disaster strikes and you lose everything at least you will have a partially completed version that your TA can mark).
  - Check your work.
    - Don't assume that everything worked out OK.
    - Instead you should check everything (click on the submitted file(s) to download them back to your computer)
    - Don't just check file names but at least take a look at the actual file contents (not only to check that the file wasn't corrupted but also that you submitted the correct version).

How To Verify Submissions In DropBox

- There is a help link provided with each assignment description.
- Teaching Assistants will cover in conjunction with Assignment zero.
- Resource file
  - http://pages.cpsc.ucalgary.ca/~tamj/resources/Verifying%20D2L%20Submissions.pdf

Backing Up And Submitting Your Work

- Bottom line: **it is up to you** to make sure things are done correctly and on time.
  - If you have questions beforehand then do ask (make sure you ask your questions early enough so you can receive an answer before the due time).
  - But don't wait until after the due date (it's too late).
  - What you submit as of the due date/time is what will be marked.
    - Late submissions won't be accepted
- Easy methods of backing up your work:
  - Save on an external flash drive
  - Email (send to yourself)

Assignments: Software Version[1]

- It is your responsibility to make sure that your submission works on the machines in MS 237.
- A1 – A3 (MS-Office 2013 assignments)
  - We use a Windows machine to mark whatever you submit
  - U of C students should be able to access Office 365 "for free" (while they are current students)
    - Info: http://www.ucalgary.ca/it/office365/faqs
    - Accessing (need a UC account):
      - http://www.ucalgary.ca/it/services/office-365 (click on the link "Access 0365 online")
      - http://office365.ucalgary.ca/
      - If have trouble accessing: contact university UC-IT
- The program written for A4 must be executable on the lab computers/online
- A5 needs to viewable using commonly used web browsers

In Class Bonus Questions (2% Bonus On Term Grade)

- They will be administered using TopHat Monacle
  - https://app-ca.tophat.com
- The questions will be 'randomly' administered during lecture (only) – no 'make up' questions
  - You will be given ample notice before the first questions begin (they won't start immediately)
  - Note that the questions will act as a 'bonus' (you may potentially be awarded an "A" grade even if you receive no marks on the TopHat questions).
  - The questions will be directly related to lecture material.

Examinations (*Proportion Of Term Grade: 60%*)

- A mix of short answer and multiple choice questions
- Closed book (don't bring anything into the exam: just yourself and writing implements)
- Midterm examination (*25% of term grade*)
  - Scheduled by your course instructor and will occur during the semester
  - *Thursday, October 20 (evening, specific time TBA) in ICT102*
  - (Note that it is outside of normal lecture time)
- Final examination (*35% of term grade*)
  - Cumulative but with a focus on topics covered after the midterm
  - The exam occurs during the regular end of term examination period so it will be scheduled by the Office of the Registrar

Mapping Your Raw Score To A Grade Point

- As stated in the course information sheet (official signed document) each major component will be awarded a grade point (and not a percentage) as the value used to determine the term grade.
  - Components that are mapped to a grade point
    - Each individual assignment
    - Total score for in-lecture TopHat questions
    - Midterm exam
    - Final exam
- The mapping of raw score to grade point will be posted before each assignment is due (variation between assignments may occur).
- Mapping of TopHat bonus questions to grade point

Percent	96 – 100	91 – 95	86 – 90	81 – 85	76 - 80	71 - 75	65 – 70	61 – 64	56 - 60	51 - 55	46 - 50	< 46
GPA	4.0	3.7	3.3	3.0	2.7	2.3	2.0	1.7	1.3	1.0	0.7	0.0

- The mapping of the midterm to grade point will be posted sometime after the midterm.
- The mapping of final to grade point cannot be provided until after the official term marks have been released (Department policy).

Estimating Your Term Grade (2)

- To determine your weighted term grade point simply *multiply each grade point* by the weight of each component.
  - **Percentages won't be used to determine the term grade**
- Sum the weighted grade points to determine the term grade.
- Simple and short example (not exactly the same as this term but it should be enough to give you an idea of how to do the specific calculations required this semester):
  - Assignments: weight = 30%, example score = A
  - Midterm: weight = 30%, example score = B+
  - Final: weight = 40%, example score = C-
  - Weighted assignments: 0.3 * 4.0 = 1.2
  - Weighted midterm: 0.3 * 3.3 = 0.99
  - Weighted final: 0.4 * 1.7 = 0.68
  - Total term grade point = 1.2 + 0.99 + 0.68 = 2.87

  (In this case the term letter is B-)

Estimating Your Term Grade (3)

- Use the spreadsheet on the course web page to estimate your term letter grade:
  - http://pages.cpsc.ucalgary.ca/~tamj/2016/203F/grade_calculator.xlsx
- The grade point to letter grade mapping employs the official university cutoffs:
  - http://www.ucalgary.ca/pubs/calendar/current/f-2.html
  - (I **may** employ a more lenient set of cutoffs at the end of term but the official cutoffs will provide you with a 'worse case' estimate of your grade).

Why Grade Points?

- It's the official university grading system
  - Alternatives are possible but require faculty level approval
- Approval of anything other than a grade point system requires predetermined cutoffs at the start of the term e.g., >= 90% equals 'A' etc.
  - Doesn't allow for consideration that individual components may be more challenging than others (lower cutoffs)
- Grade points are more lenient for grades on the lower-middle end of the scale
  - Grade points: Getting an "A"/4.0 on the assignment component worth 30% of the term grade yields a minimum term grade of 1.2 (4.0 * 0.3) which equates to a term grade of 'D' (possibly higher)
  - Percentages: Getting an "A" may roughly work out to 90% or higher (depending on the scale) which works out to a minimum term percent of 27% = 90% score * 30% weight…almost certainly an "F" for the term grade.

Program Writing: Never Programmed Before?

- You aren't alone! In fact during most semesters this applies to the majority of students.
- Although you will create a program for this class (and be tested on this material during the final exam) this class is not designed for computer science majors
  – This means that we will "go slow", repeat important concepts etc. - the programming component is 'lighter' than for majors.
  – But the programs produced for this class are more 'practical'

Assignments: 203 vs. 217

- Program size (CPSC 217 non-majors programming class):
  – A text-based computer game "The hobbit": 677 line program

- Program size (this class):
  – VBA (changing the capabilities of MS-Word): 60 line program
  – JavaScript (running a program through a web page): 70 line program

Final Exam: Programming Questions

- Average grades (programming questions, final exam):
  - The values indicate that the typical student shows a reasonable grasp of the material (i.e., they did "get through it")
  - In order to do well you need to be coming to class and doing extra work:
    - The absolute minimum workload is to complete the assignment
    - The more practice you get, the more skilled and knowledgeable you will become

What If 203 Still Isn't Technical Enough For You?

- Think this course is too easy?

- There are other introductory courses that may be of interest.
- Both are introductions to problem solving by *writing/creating computer programs*.
  - For the following classes program writing ("programming") is required for almost all assignments/lecture topics
  - CPSC 217: For non-Computer Science majors
  - CPSC 231: For Computer Science majors

Image of James curtesy of James Tam, other images from Microsoft

How To Succeed In This Course: A Summary

1. Practice things yourself
2. (Programming section): Make sure that you keep up with the material
3. Start assignments early
4. Take good in-class notes, not just what I write but also what I say.
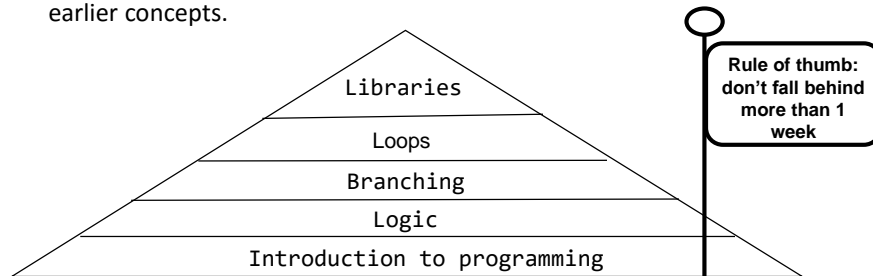
#1 Practice Things Yourself

- Recall

#2 (Programming): Keep Up With The Material

- (This applies to all topics but is especially pertinent to the program writing section – A4 material - of the course).
- Concepts are cumulative and progressively more challenging
  - Many of the concepts taught later depend upon your knowledge of earlier concepts.

Libraries

Loops

Branching

Logic

Introduction to programming

Rule of thumb: don't fall behind more than 1 week

  - Don't let yourself fall behind!
  - *At least* attempt the assignment.

#3 Start Assignments Early

- Don't look at the material just before the due date, instead you should be studying the concepts as you learn them throughout the term.
  - Programming section (A4): It's important to work through and understand concepts *before* you start.
  - If you try to learn a new concept *and* work out a solution for the assignment at the same time then you may become overwhelmed.
- Don't start assignments the night (or day!) that they are due, they may take more time than you first thought (start as soon as possible).
- Some assignments may require the application of multiple concepts, not all the concepts have to be completely covered before you start working on an assignment.
  - Start working based on what's currently been covered

#4 Take Good In-Class Notes

- Hierarchy of note taking
  - None: just memorize course slides/notes.
  - Moderate: write notes when the instructor writes things out ("must be important").
  - Extensive: write notes when the instruction writes things out but also when that person verbally describes things.
- This is essential when complex technical concepts (e.g. writing programs – A4 material) are covered.

How To Succeed In This Course: A Summary

1. Practice things yourself
2. (Programming section): Make sure that you keep up with the material
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4. Take good in-class notes, not just what I write but also what I say.

Feedback

What is he talking about???

Wow I am the greatest speaker in the world!

Let me know how things are going in the course:
- Am I covering the material too slowly or too quickly.
- Can you read the slides and my hand writing.
- Can you hear me in the class.
- Etc.

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