

Welcome to COSC 123!



Computer Creativity

Introduction to COSC 123 – Computer Creativity

Credits and Acknowledgements

- Many thanks to Drs. Abdallah Mohammed for creating the course notes, which we will instead of a “textbook” in this course
- Thanks also to Dr. Ramon Lawrence for creating the original version of this course and creating a vision of what this course should be.

About me



Firas Moosvi

Lecturer

University of British Columbia
Okanagan



Biography

I am a Lecturer in the Computer Science, Mathematics, Physics, and Statistics department at the University of British Columbia Okanagan. I received my PhD in Physics from the Reinsberg lab in 2019 where among other things, I developed a new MRI technique to assess the oxygenation status of tumours using independent component analysis (ICA). During my PhD I got interested in data science, learning analytics, and science communication and that led me to learn more about statistical techniques such as ICA, and data visualization using interactive dashboards.

Interests

- Magnetic Resonance Imaging
- Tumour biology and physics
- Data visualization and science communication
- Learning analytics
- Scholarship of Teaching and Learning

Education

- PhD in Medical Physics, 2019
University of British Columbia
- MSc in Medical Biophysics, 2012
University of Toronto
- BSc in Biophysics, 2009
University of British Columbia

Research Interests

Research Interests



Learning Technologies

Use of learning technologies to enhance teaching and learning.



Active Learning

A learning method that de-emphasizes didactic teaching and actively engages students with material via problem solving, case studies, role plays and other methods.



Learning Analytics

Extracting trends from learner data using analytical tools to improve learning.



Equity in STEM

Developing and implementing methods of inclusive teaching to reduce systemic inequities in STEM education.



Visualizations

Representing data using effective graphs, plots, and other special visualizations.



Alternative Grading

Challenging the systems and structures associated with traditional grading in higher education.

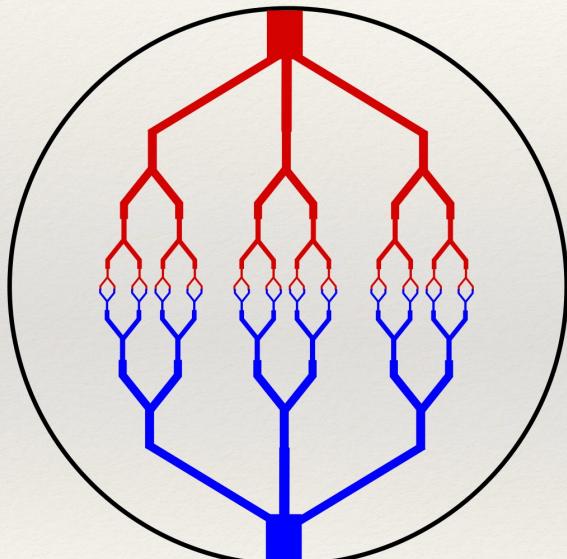
Research Interests

Introduction

4

Implications of abnormal tumour vasculature

Normal blood vessels



Tumour vessels



- ▶ Hypoxic and acidic environments significantly affect treatment and progression of cancer
- ▶ Abnormal perfusion patterns in the tumour limits delivery of drugs to target regions
- ▶ This necessitates higher doses that increases toxicity

Research Interests



Optical Frequency Domain Imaging (OFDI)

- ◆ Anaesthetized mouse brain imaged through **cranial windows** using optical imaging techniques
- ◆ Vessel colour encodes **depth**; closer vessels are yellow and further vessels are red
- ◆ Note the normal brain vascular branching patterns in quadrants I, II, and III compared to the chaotic network of the **U87 tumour** in quadrant IV

Computer Creativity

Processing



Okanagan

Slides courtesy of Dr. Abdallah Mohamed.

Course Objectives

- 1) To be creative with programming and write fun, interesting computer programs.
- 2) To master fundamental programming skills of data variables, decisions, iteration, methods, and the basics of object-oriented programming, and how to create larger programs
- 3) To design and develop strategies for solving basic programming problems.
- 4) To algorithmically create 2D graphics, animations, and simple games using Processing language.
- 5) To design interactive graphical user interfaces.
- 6) To learn how to switch from Processing to Java.

The Essence of the Course

- If you walk out of this course with nothing else you should:

Become a creative programmer with the ability to problem solve, perform critical thinking, and communicate precisely.

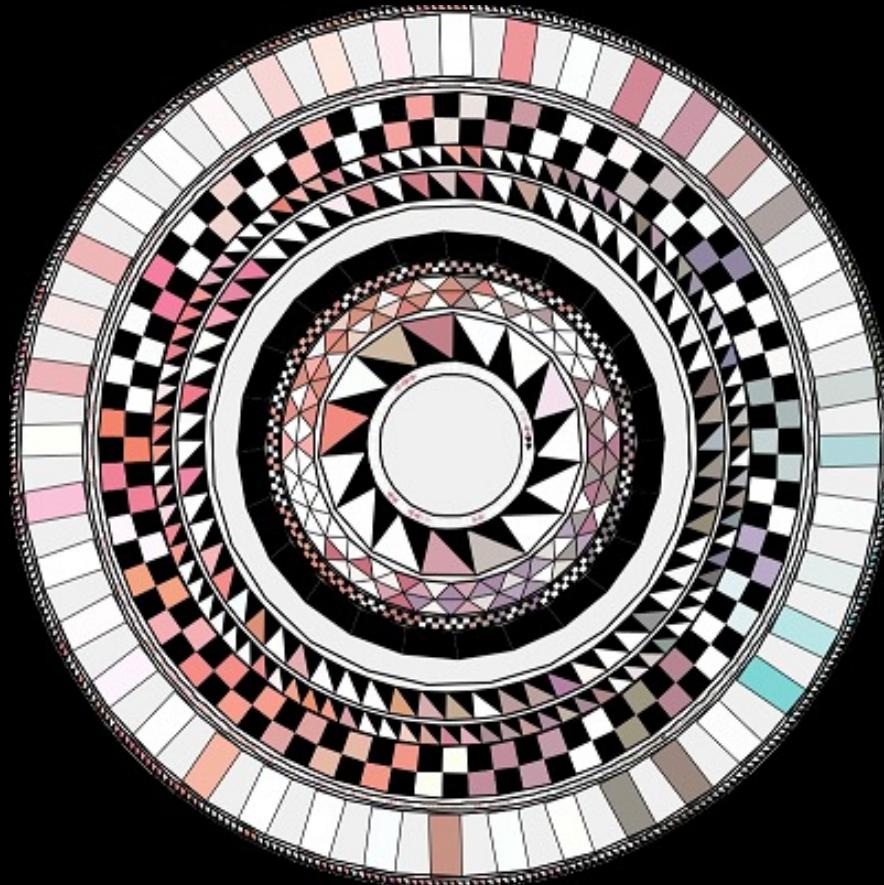
- This course is not only about learning a particular language (or even programming itself), it is about being a creative problem solver and critical thinker!

Programming using Processing

- You already learned algorithmic thinking using basic programming techniques in COSC111 and COSC122.
- In addition to being able to solving algorithmic problems (similar to what you did in COSC 111 or COSC 122), we will try to re-learn programming using graphical functions, especially to create user interfaces, animations, and simple 2D games.
- We will use basic programming techniques (e.g. conditionals, loops, arrays, objects, etc.) on *Sketches* to draw and interact with shapes and images.

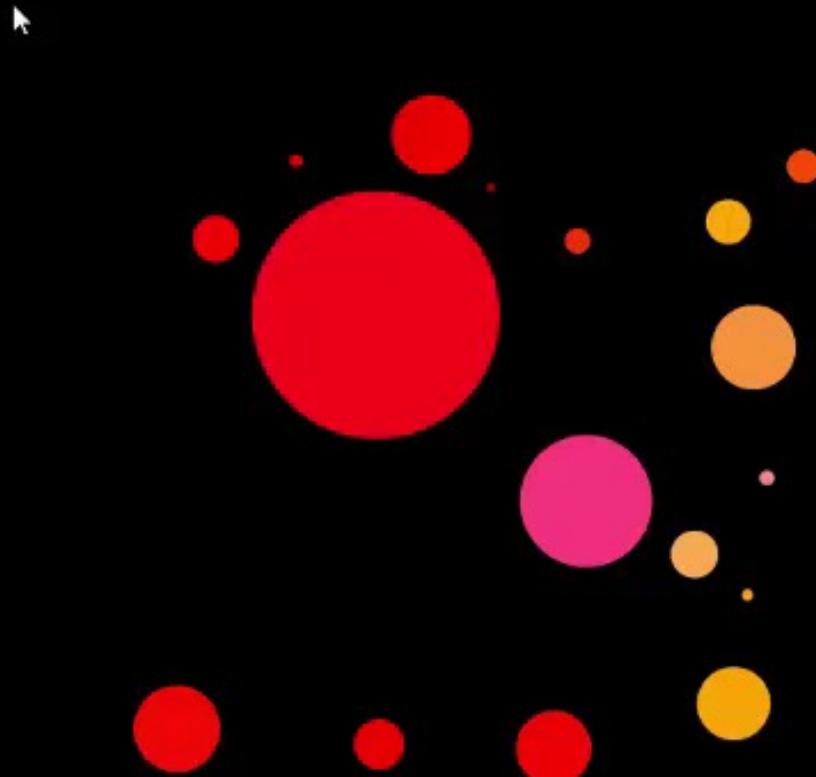
Processing Examples!

- Algorithmic Drawing
 - Example: Artistic Designs



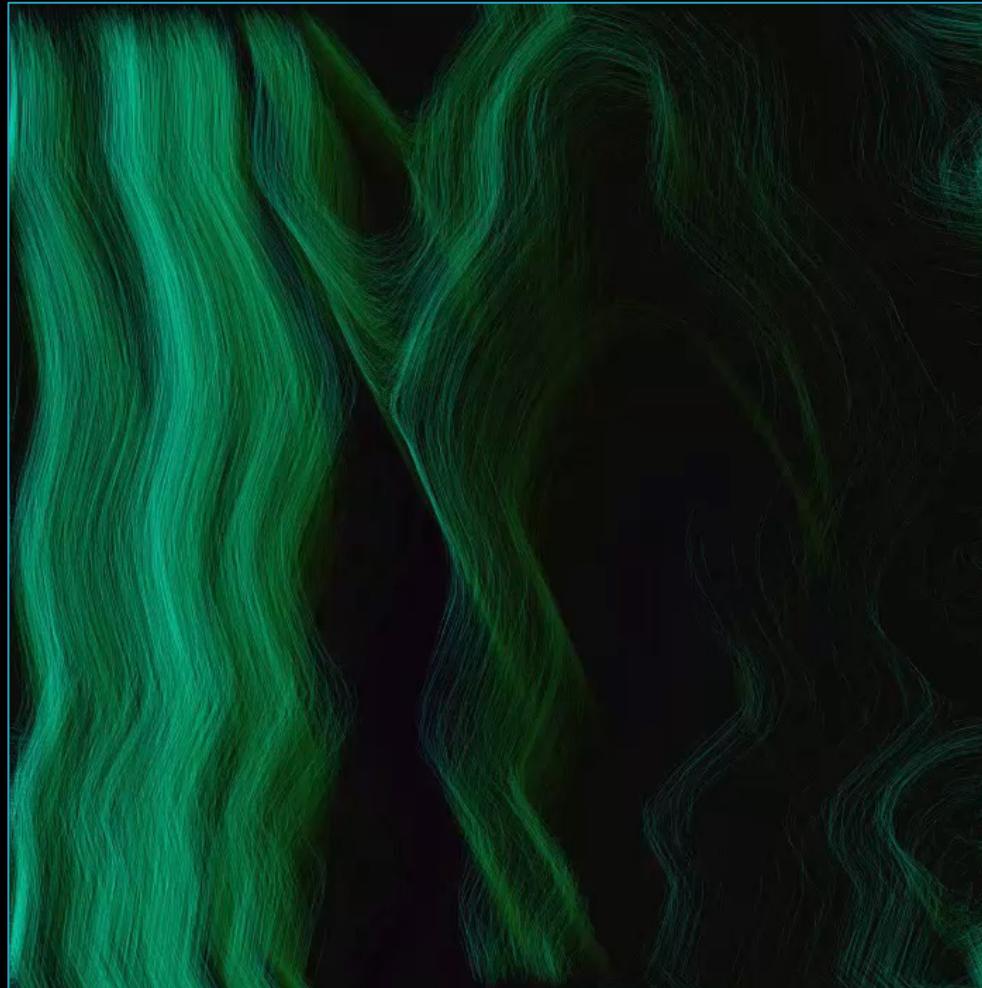
Processing Examples!

- Artistic Animations
 - Example:



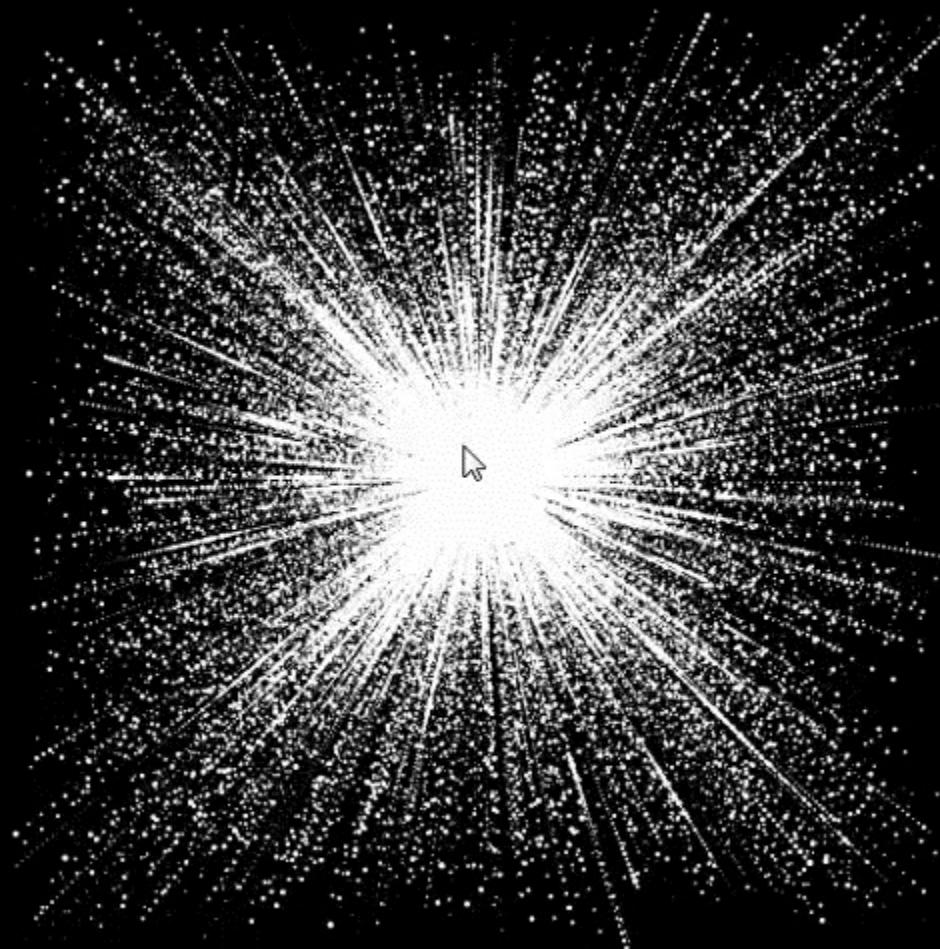
Processing Examples!

- Artistic Animations
 - Example: particle systems



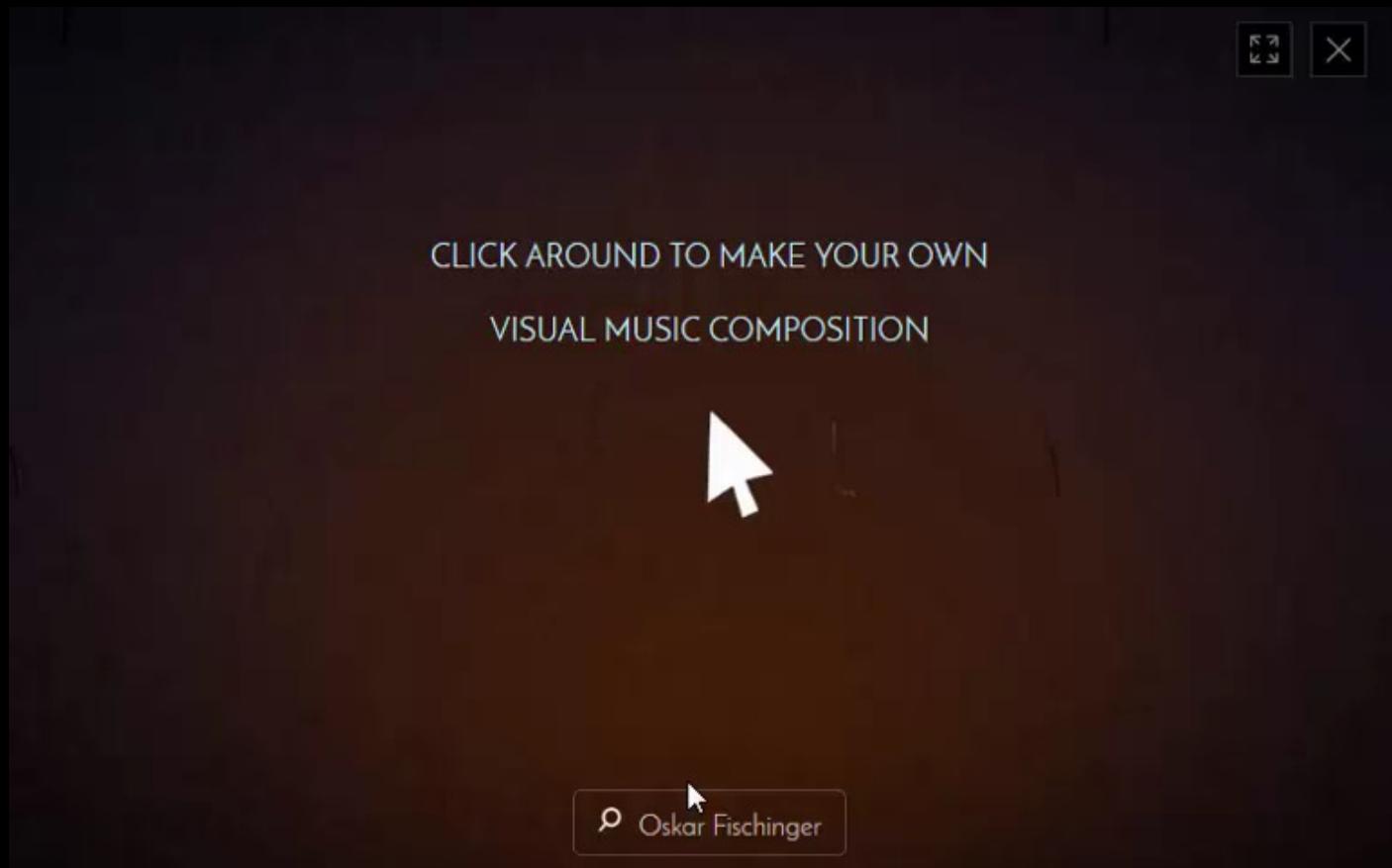
Processing Examples!

- Interactive Animations
 - Example: controlled particle system



Processing Examples!

- Interactive Animations
 - Example: Google Doodle (June 2017)



Processing Examples!

- Interactive Animations
 - Example: 2D Games

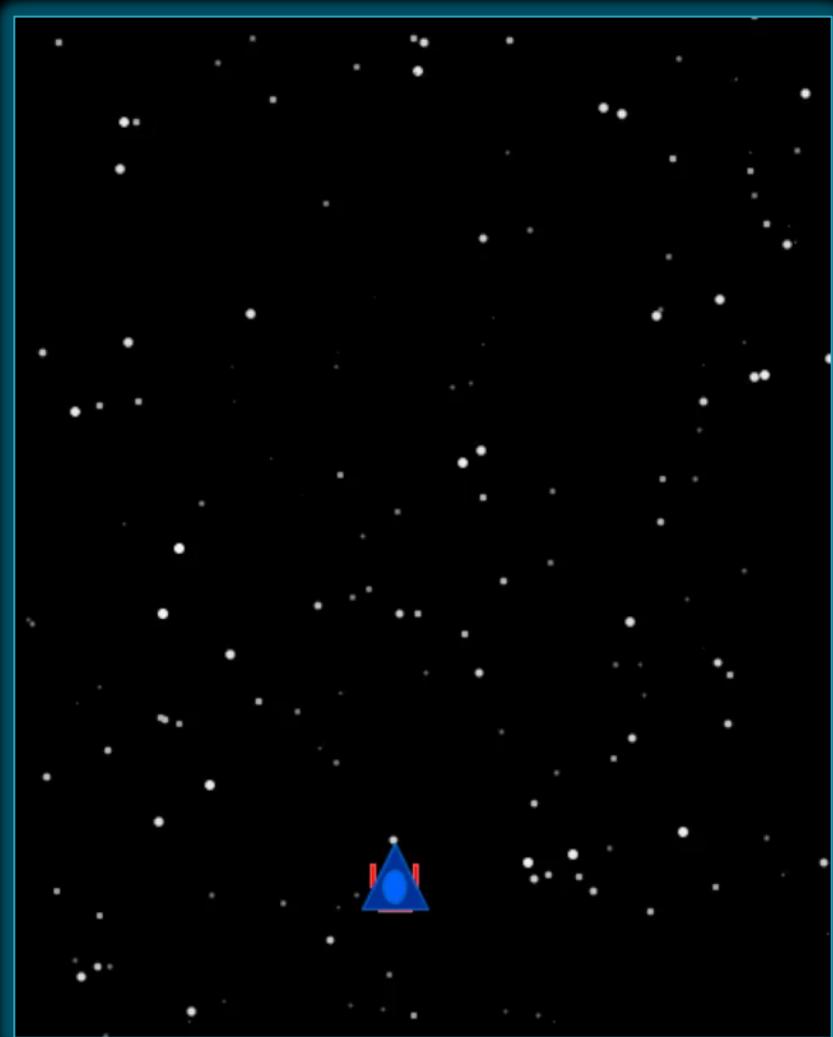


Example of things you will do!

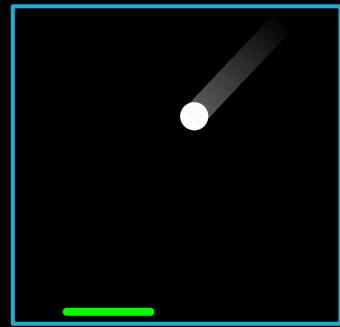


CREDITS: DR. ABHILASH HOBANI, COSC-123

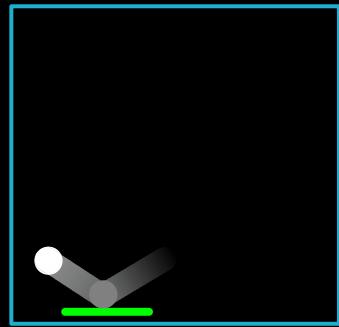
Example of things you will do!



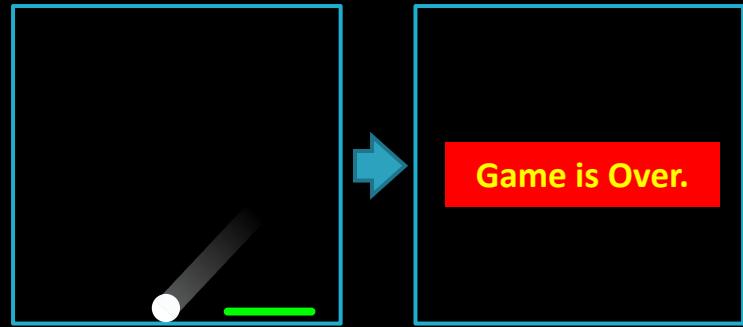
Example of things you will do!



Player needs to move the paddle to hit the ball up



When the ball is hit, score is incremented and ball speed increases



If ball touches bottom edge, game is over, and animation stops.

Why this Course is Important

- This course will make programming fun and relevant.
 - Our economy, health, and entertainment is dependent on software written by programmers.
 - We will learn to be creative programmers, so that we may create great software to be used by others.
- Important results:
 - ***Storyboarding*** – We will sketch our stories before programming them.
 - ***Algorithmic Thinking*** – We will learn how to solve problems by specifying precise sequences of actions.
 - ***Collaboration*** – We will program in teams of two to build interpersonal skills and increase our knowledge.
 - ***Processing and Java Languages*** – We will use Processing which is based on Java programming language – Java can be used in many areas including future computer science courses.

Computer Creativity

Ed Discussion (Demo)

Interface

Clean and intuitive.

Start a new thread

ed Playground - Discussion

New Thread

COURSES

- CS 101
- ECON 102
- MATH 201
- ENGG 202
- Playground

CATEGORIES

- General
- Lectures
- Tutorials
- Problem Sets
- Assignments
- Midterm
- Exam

42 others online

Open Ed Discussion

Quadratic equation

Anonymous 2 hours ago in Lectures - W1 ENDORSED

Hi all,

How do we solve $ax^2 + bx + c = 0$?

Comment Edit Delete Unendorse ...

1 Answer

Scott Maxwell STAFF 2 hours ago

Good question! You can use the quadratic formula:

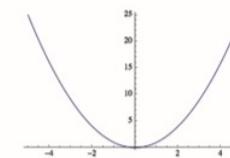
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Comment Edit Delete Endorse ...

Add comment

Emily Kwong 2 hours ago

Also note the graph of a quadratic function is called a parabola and has this general shape:



Open a thread

Read and respond to threads

Tips and tricks

Search and stay notified about threads.

Search for relevant **threads**

The screenshot shows a user interface for a discussion board. At the top, there's a purple header bar with the text "ed Playground - Discussion". Below the header is a sidebar on the left containing a "New Thread" button, a "COURSES" section with links to "CS 101", "ECON 102", "MATH 201", "ENGG 202", and "Playground" (which is highlighted), and a "Search" bar with a magnifying glass icon. The main content area displays a "Pinned" thread titled "Welcome!" by "General" user "Scott Maxwell" (STAFF) posted 4 hours ago. Below it is a "This Week" thread titled "Quadratic equation" by "Anonymous" posted 2 hours ago in "Lectures - W1". There are also small icons for reply, endorse, and view.

Stay **notified** about threads

Quadratic equation

The screenshot shows a detailed view of a thread titled "Quadratic equation". The post was made by "Anonymous" 2 hours ago in "Lectures - W1" and has an "ENDORSED" badge. The post content is "Hi all, How do we solve $ax^2 + bx + c = 0$?". Below the post are standard interaction buttons: Comment, Edit, Delete, Unendorse, and three dots. To the right of the post are several icons: a pin icon, a star icon, a bell icon, and a magnifying glass icon. Next to the magnifying glass icon, the number "242" is displayed with the word "VIEWS" below it. A callout bubble provides options for notifications: "Not Watching" (be notified of direct replies only), "Watching" (be notified of all activity in this thread, which is selected with a checked checkbox), and "Ignoring" (never be notified).

Post a question

Ask, with confidence.

Cancel **New Question** Post

Select Type **Question** Post

Insert Title

Select Category General Logistics Sections **Assignments** Code Social

⚠ Select a category.

Private
Visible to you and staff only

Anonymous
Hide your name from students

Post

Express yourself in any way

Superb all-in-one editor to better communicate your ideas.

Format text Hyperlink text Create a list Upload an image Embed a video Upload documents Write an equation Write code Insert web snippets Annotate images



Ed Discussion allows users to:

- Upload images
- Embed videos
- Write math equations
- Upload documents
- Embed runnable codes
- Annotate images

$$u(x,t) = \frac{1}{\sqrt{4\pi kt}} \int_0^{\infty} \left[\exp\left(-\frac{(x-y)^2}{4kt}\right) - \exp\left(-\frac{(x+y)^2}{4kt}\right) \right] g(y), dy$$

▶ Run Line Numbers Runnable Python

```
1 print ("Hello, world!")
```

Hello, world!

Private

Visible to you and staff only

Post

Submit your post

Profile

Password

Emails

My Courses

Notifications

SSH Keys

Merge Accounts

Activity Digests

Be alerted via email about new threads in the discussion you have not read.

Choose how frequently you would like to receive these emails, or turn it off completely.

Use global setting

▼ Per-course digest settings

COSC 111

2021 WT2

Use global setting

COSC 123

2021 WT2

Use global setting

Firas Sandbox

2020 X

Use global setting

UBC Playground CS

2020 X

Use global setting

Save

Notification Emails

Email me when there is activity in a thread I am watching

Get an email when someone posts a reply in a thread you're watching.



Email me when someone replies to my thread

Get an email when someone posts a direct reply to your thread.



Email me when someone replies to my comment

Get an email when someone posts a direct reply to your comment.



Save

Get invited to Ed Discussion



COSC 123

Search this book...

Before term starts

ABOUT THIS COURSE

Unsyllabus

Course Schedule

Ed Discussion

GETTING STARTED

Before the Term starts

In the first week

After the First Class

There are several things you'll need to do at the start of the course to get set up with all the technology, accounts, and services we'll be using. I've split these tasks up into several chunks so it's a bit more manageable.

4. Join Ed Discussion and say hi!

You will be invited to Ed Discussion based on the email you enter [in this form!](#) I will invite folks a couple of times a day.

2021S2

Home

Course Content

Discussions



Setup your Machine



COSC 123

Search this book...

Before term starts

ABOUT THIS COURSE

Unsyllabus

Course Schedule

Ed Discussion ↗

GETTING STARTED

Before the Term starts

In the first week

At the end of the first week

Setup Your Machine

macOS Install Instructions

Windows Install Instructions

Ubuntu Install Instructions

Processing

To install the Processing Development Environment (PDE), you should follow these steps:

1. [Visit the download page.](#)
2. Download the installer for the latest version (v4.0 beta 2) your operating system (Windows, macOS, or Linux)
3. See the installation instructions for your operating system ([adapted from here](#)):
 - On Windows, you'll have a .zip file. Double-click it, and drag the folder inside to a location on your hard disk. I suggest a location where your other programs are stored. Once it's moved out of the unzipped folder, you can double-click processing.exe to start.
 - On macOS, the installer is also a .zip file. Double-click it and drag the Processing icon to the Applications folder. Then double-click the Processing icon to start.
 - The Linux version is a .tar.gz file. Download the file to your home directory, then open a Terminal window, and type: `tar xvfz processing-4.0b2-linux64.tgz`. This will create a folder. Then change to that directory: `cd processing-4.0b2` and then run it by typing `./processing`.

That's it!

You have completed the installation instructions, well done 🎉! Remember to add a screenshot as instructed in your lab!

Attributions

Important

This guide has been adapted from the UBC-Vancouver [MDS Install stack](#) under a CC-BY-SA 4.0 license.



Contents

Web browser

Zoom

GitHub.com account

Visual Studio Code

GitHub.com

Terminal

Git and GitHub

Install Git on your computer

Configuring Git user info

[Create your GitHub "Personal Access Token"](#)

Processing

That's it!

Computer Creativity

Break



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Slides courtesy of Dr. Abdallah Mohamed.

Computer Creativity

Unsyllabus (Demo)



Okanagan

Slides courtesy of Dr. Abdallah Mohamed.

Navigating the course website

Unsyllabus

Teaching Team 🎓

Information about the teaching team and how to contact us.

Course Schedule 📅

A table of course topics and a week-by-week plan of what we intend to cover.

Doing Well 😊

Strategies and tips on how to do well in this course.

Getting Help ❤️

Learn how to get help and get support if you're struggling, academically or otherwise.

Evaluation ✅

Information about the grading system and evaluation scheme for this course.

Teaching Philosophy 🧑‍🏫

How this course will be taught and how humans learn (you may be surprised!).

Changes 🚨

List of changes made to the Unsyllabus since the start of term, and a rationale.

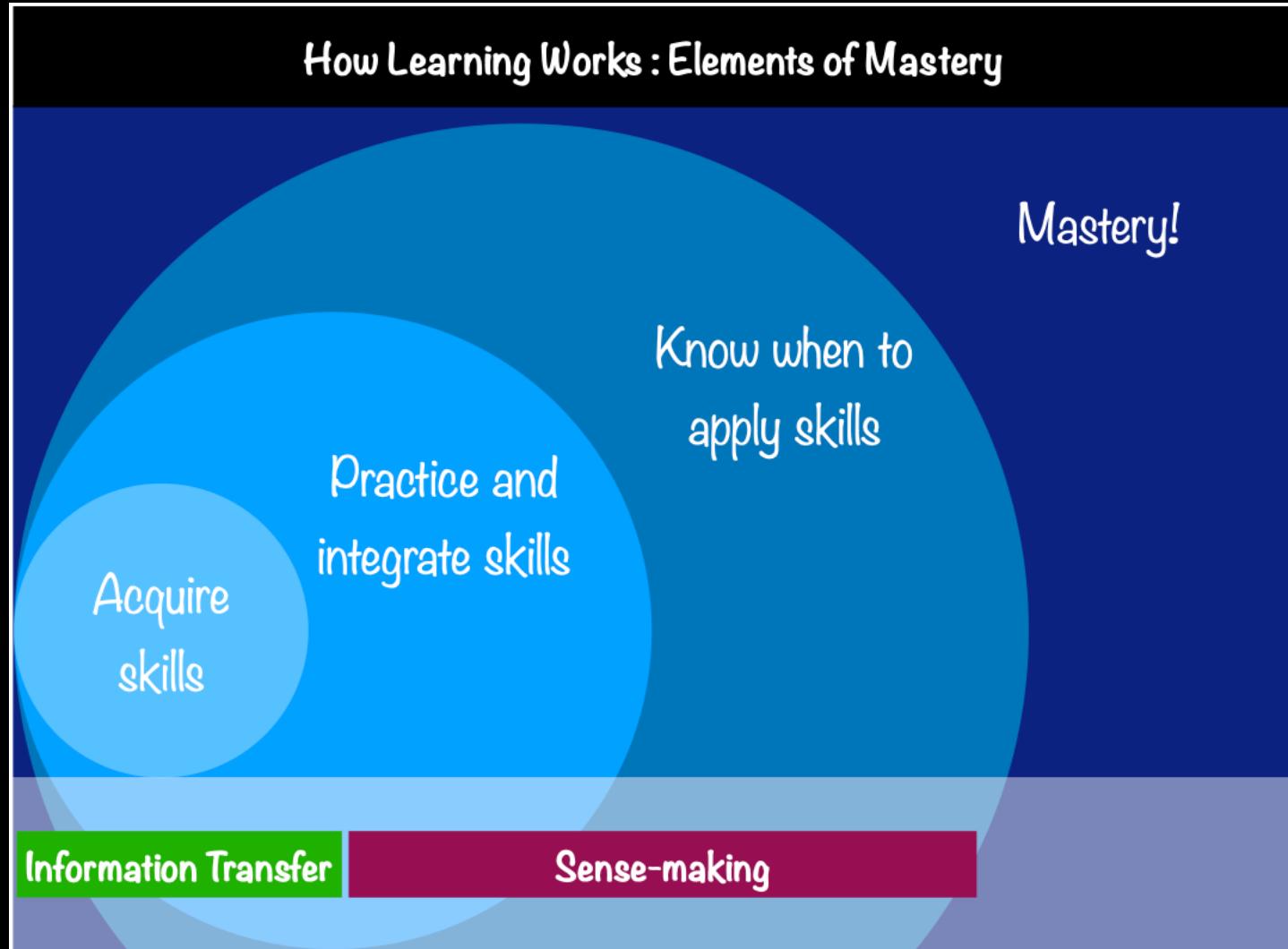
Honesty & Integrity 😊

Completing this course with honesty and integrity. Examples of things you can and should not do.

Special Days 🌟 ❤️ 🎂 😊

What to do if you have to miss things because of special days (including getting sick).

How Learning Works



How Learning Works

	Information Transfer	Sense-making
What?	<ul style="list-style-type: none">- Notes- Readings- Videos- Simulations	<ul style="list-style-type: none">- Worksheets and clicker questions- Homework assignments- Labs- Worked examples
When?	<ul style="list-style-type: none">- Before class	<ul style="list-style-type: none">- During and after class- Tutorials and office hours- Watch parties
Where?	<ul style="list-style-type: none">- Online (asynchronously)	<ul style="list-style-type: none">- Online (synchronously)- Online (asynchronously)
Who?	<ul style="list-style-type: none">- Textbook publishers- Open education resource developers- Non-profit organizations- Content experts	<ul style="list-style-type: none">- Course instructor- Teaching assistants- Classmates

Course features

- 48 hour grace-period on all due dates and deadlines.
- Lab attendance is not mandatory (attend any and all sections that work for you).
- Classes are recorded, but not live streamed. Recordings are available 24–48 hours after the class.
- Many opportunities to demonstrate your learning.
- Weekly learning logs and reflections to make you think about your learning (metacognition).
- Each test has a "bonus test" available one week later; for each test, we will take the better score of the pair.

Course features

- No high-stakes exams (the single largest assessment item is the final exam).
- All course assessments are completely open book, open notes, and open web (except for cheating websites like Chegg, CourseHero, Slader, Bartleby, etc...)
- Plenty of TA and instructor student hours and several outside of normal business hours.
- Class website that outlines exactly what you should do when to help you manage your time.
- Tonnes of supplemental materials including other - instructional videos in case you want a different perspective.
- A true willingness from the instructor (me) to help you learn and succeed in this course!

Markdown Tutorial (20 mins)



Introduction

Each lesson introduces a single Markdown concept with an example. When you see a red pulsing circle in the example, select to examine it for details.

After studying the example, try a few practice exercises with your new knowledge. Skip to any lesson at any time via the navigation controls. Experiment and have fun!

This tutorial is open source – [help us improve it!](#)

BEGIN LESSON →

WHAT IS MARKDOWN?

Intro ■

Emphasis ■

Paragraphs ■

Headings ■

Blockquotes ■

Lists ■

Links ■

Images ■

Code ■

Nested Lists ■

The End ■

Computer Creativity

See you on Friday!



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Slides courtesy of Dr. Abdallah Mohamed.