Software Engineering

YSC3232

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Me – Luiz Fernando Capretz

- ☐ **Visiting Professor of Computer Science**
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  - • **please shoot me an info email**
- ☐ **lfc@nus.edu.sg**

2 Mentors and 1 Grader

- Ozair Faisal – ozair.faisal@u.yale-nus.edu.sg

- Syed Mustafa Umar – syedmustafa@u.yale-nus.edu.sg

- Office: online, by appointment, send an email first.

- Sam Kouteili – sam@u.yale-nus.edu.sg

You – CS major, minor, dual

- **Windows vs Mac vs Linux vs …**
- **Follow and Agile Process (SCRUM)**
- **Assignments, quizzes, exams, discussions**
- **Group Project and Presentation (4 members)**
- **Deadlines**
- **Must implement a software system.**

I Like to Teach this Course…

- ☐ **We learn from each other**
- ☐ **Listen without judging**
- ☐ **Speak without criticizing**
- ☐ **Encourage personal growth**
- ☐ **Respect individual differences**
- ☐ **Sense of accomplishment**
- ☐ **…it is a collective responsibility.**

Rafting-101: Exciting

Rafting-101: Decisions on the Go

Rafting-101:Learn from Mistakes

Rafting-101: Smooth Ride

Rafting-101: Reach your Goals

What Have I Learned?

- ☐ **Prezi**

- ☐ **Git**

- ☐ **Trends in Technology: Desktop to Laptop to Web to Mobile to Social Networks to Cloud Computing...**

- ☐ **Use everything that you have learned**

- ☐ **Please teach me something new**

- ☐ **We won't split the tuition, though.**
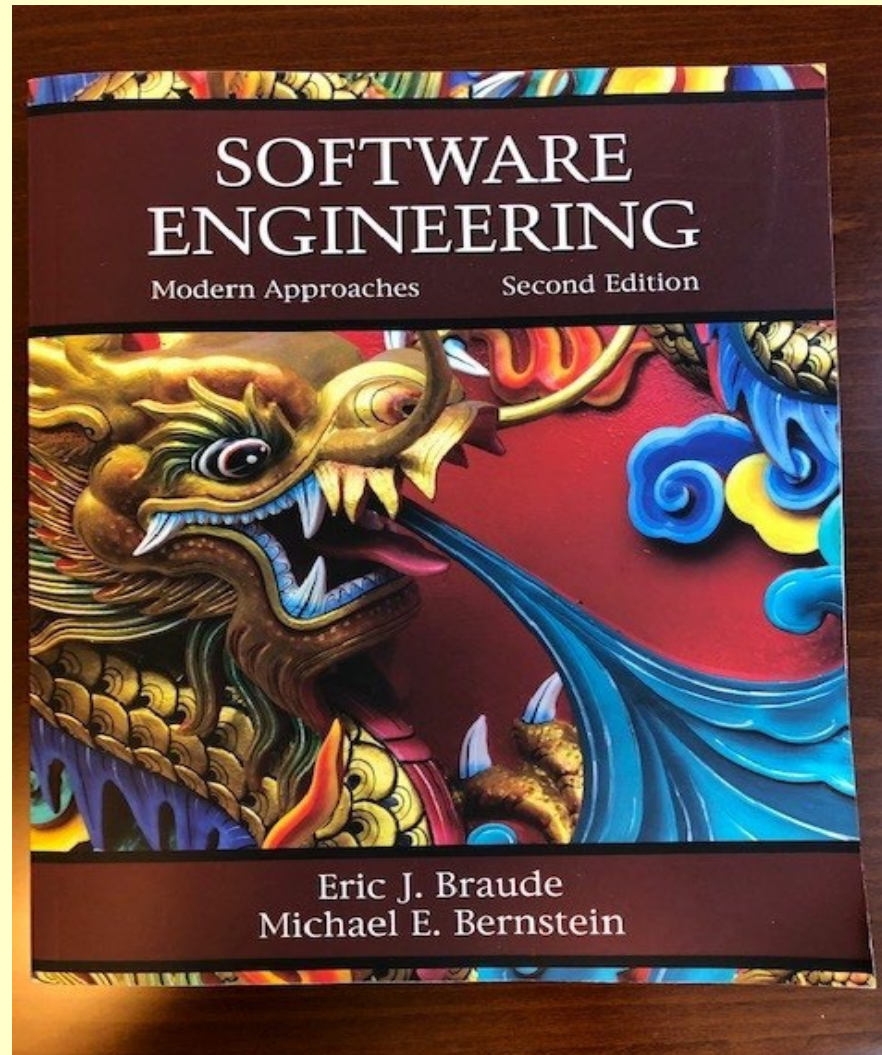
Five Pillars of Well-Being…

- ☐ **Positive Emotions**
- ☐ **Engagement**
- ☐ **Positive Relationships**
- ☐ **Meaning and Purpose**
- ☐ **Sense of Accomplishment**

Are you distracted by your social media responsibilities?

▢ **Food for thought: Documentary www.thesocialdilemma.com**

▢ **Center for Humane Technology: www.humanetech.com**

Recommended Textbook

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Course Milestones/Deliverables

☐ **Contributions (10%) - get used to it**

☐ **Individual Assignments/quizzes (15%)**

☐ **Midterm Exam (15%) – March 2nd**

☐ **Final Exam (20%) – April 13th**

☐ **Group Project (40%) (4 members)**

- **Implement a software (e-Grocery)**
- **Document software**
- **Present and demo software**

☐ **Bonus (5%) for the most innovative, creative, impressive, and complete project.**

Some Learning Outcomes

- **Methodologies ("philosophies") to develop software systems**

- **Notations for software requirement and design**

- **Techniques and Tools for software development**

- **Software lifecycle models (Waterfall, Prototyping, Agile, SCRUM, DevOps…)**

- **Human Factors in software development.**

Project: e-Grocery System

- ☐ **Requirement**
- ☐ **Design**
- ☐ **Test Cases**
- ☐ **Documentation**
- ☐ **Software**
- ☐ **Etc.**

Technology to learn and use

- **Creatly tool for UML diagrams, not StarUML**

- **Github for documentation, configuration management, collaboration, etc.**

- **MangoDB, mySQL for database**

- **Javascript, NodeJS, Angular, Laravel for web and mobile applications**

- **Slack, Jamboard, Google Docs for Collaboration**

- **Any other useful tool that you are familiar or willing to learn and use.**

Library and Code Repositories

- **Library Resources**
- **Github, Google Code, Source Forge**
- **Do not reinvent the wheel.**

Introduction Round

- ☐ **Your name?**

- ☐ **Where is home?**

- ☐ **Your software development skills?**
  - • **How you developed any system?**
  - • **Have you written a 5K lines program?**
  - • **Programming languages you know?**
  - • **Are you Mac or Windows or Linux fan?**
  - • **Which major/minor degree?**

Group Project – Matrix of Responsibilities

- A clear description of who is going to do what – individual strength

- Project scope commensurate with group size

- Similar contribution to the outcome is expected

- Marks will reflect contribution to the group - No free riding!

Matrix of Responsibilities

Tasks/Responsibilities	Member 1	Member 2	Member 3	Member 4
Task 1	Degree of Involvement			
Task 2				
Task 3				
Task 4				
Task 5				
Task 6				
Task 7				

Flexibility and Resources

- ☐ **Labs for Software Development**
- ☐ **Your Room or Garage or Home**
- ☐ **Your Laptop**
- ☐ **Your Mobile Device.**

Review and Walkthrough

- ☐ **Present Requirements and Design**
- ☐ **Upload slides to Canvas**
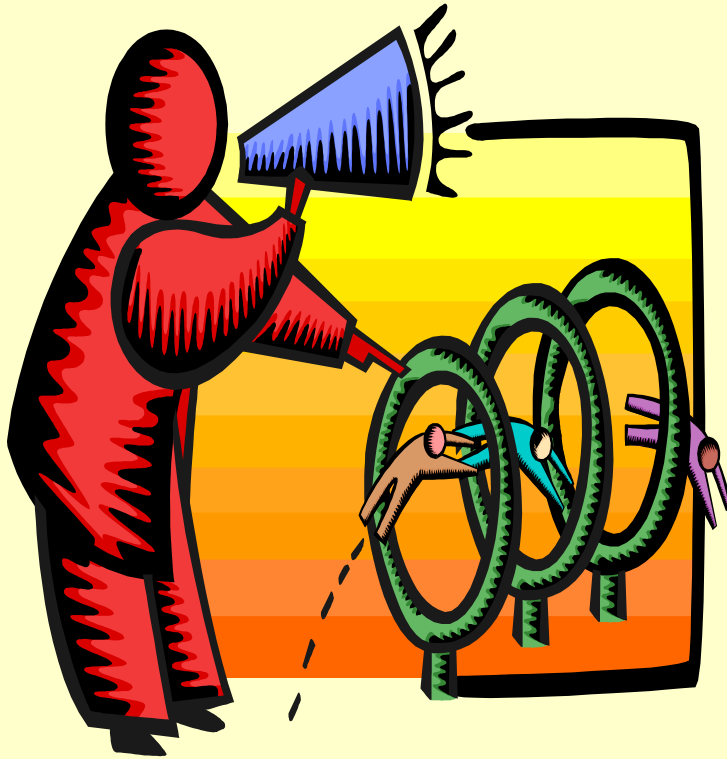- ☐ **Feedback.**

Implementation and Testing

▢ **By March**

▢ **Add Ozair, Sam and me as collaborator in Github:**

- **lcapretz@uwo.ca**
- **Ozair's?**
- **Sam's?**

Project Demonstration

- March/April
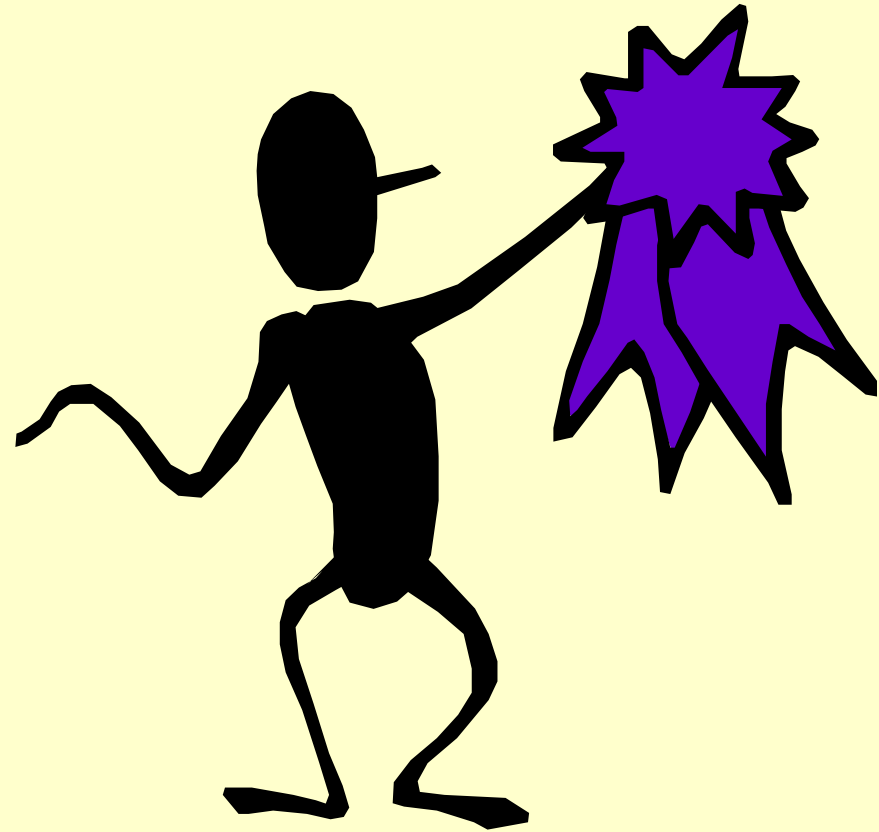- Order to be decided based on consensus

Project Presentation

- ☐ **March/April**
- ☐ **Upload slides**
- ☐ **Contest and prizes**
- ☐ **Feedback and Discussions.**

Bonus! Bonus! Bonus!

- Best project and winning to competition (5%).

Final Report

- ☐ **Final Retrospective**

- ☐ **Deadline: April**

- ☐ **Upload to Canvas**

Eisenhower said…

"In preparing for a battle I have always found that plans are useless, but planning is indispensable."

To Succeed Be SMART

SMART Objectives

- **S**pecific
- **M**easurable
- **A**ppropriate
- **R**ealistic
- **T**ime-Related

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Consider the business context

Business goals

Department goals

Business problem

What pain is the goal trying to address?

Specific

What will I accomplish?

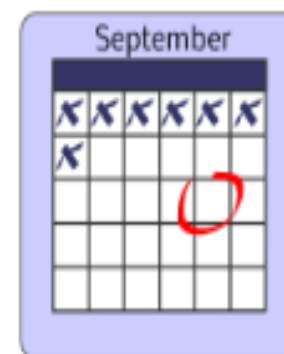**Measurable**

23%

+$

ratio

How will I know I have achieved it?

Achievable

✗ No!

✓ Yes!

How will I achieve it?

Relevant

Business Problems

How does it relate to the business problem?

Time- Delimited

September

When will I achieve it?

What is wrong with this goal?

What would a Specific, Measurable, Achievable, Relevant, Time-Delimited goal sound like?

Common Pitfalls

- **Project too easy or too difficult**
- **"The system is 95% complete, and I expect to finish the remaining 40% by tomorrow".**
- **It took me 2 months to complete 95% of the project, the remaining 5% will take us another couple of months".**

Choose your Group Wisely

- ☐ **Memorizer with Expectations**
- ☐ **Just Puttin' in Time**
- ☐ **Relaxed**
- ☐ **Strategist**
- ☐ **Non-Strategic Worker Bee**
- ☐ **Driven to Succeed**
- ☐ **Inquiring**
- ☐ **Scholar.**

Marks will reflect contribution – Interview

- ☐ **Shared Leadership**
- ☐ **Decision Making Process**
- ☐ **Team Orientation**
- ☐ **Learning**
- ☐ **Autonomy**
- ☐ **CANNOT choose parents or relatives**
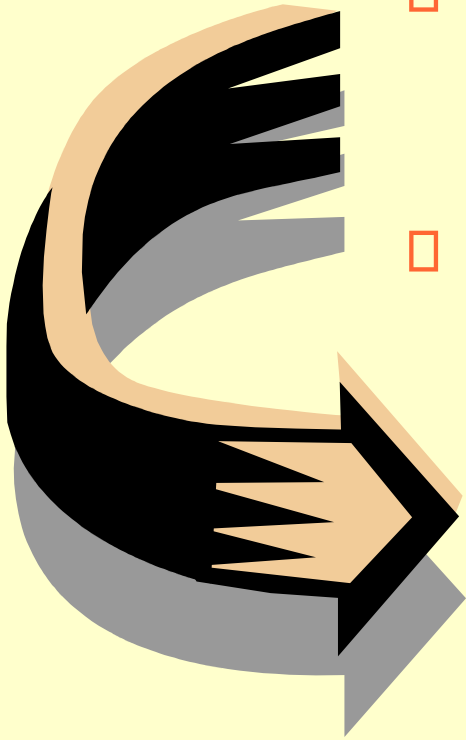- ☐ **CAN choose friends and partners.**

Like Marriage…

- **Choose your partner wisely, not faster.**

- **Complaining about partner is an example of one's incompetence.**

Worry,…

- At a recent software engineering course, the students were given an awkward question to answer:

- If you had just boarded an airliner and discovered that you had been responsible for the flight control software.

How many of you would disembark immediately?

If you would disembark, raise your hands, please.

…but be happy

- Among the ensuing forest of raised hands only one student sat motionless. When asked what he would do, he replied:

- "I would be quite content to stay onboard. With my software, the plane was unlikely even to taxi as far as the runway, let alone take off".

Main Goals

- My goal is to show you that requirements, design and implementation do not have to be bothersome drudgery, but can be a very creative, interesting parts of software development.

- My goal is that you will be able to derive a sense of pride and pleasure that a true craftsperson realizes from a job well done.

In Summary . . .

- ☐ **Everything in this course must be done individually.**

- ☐ **Except the team project (4 members)**

- ☐ **Must implement something**

- ☐ **Project walkthrough, demo, and presentation**

- ☐ **Bonus for best project**

- ☐ **Stay tuned to e-mails, announcements, and visit Canvas weekly.**