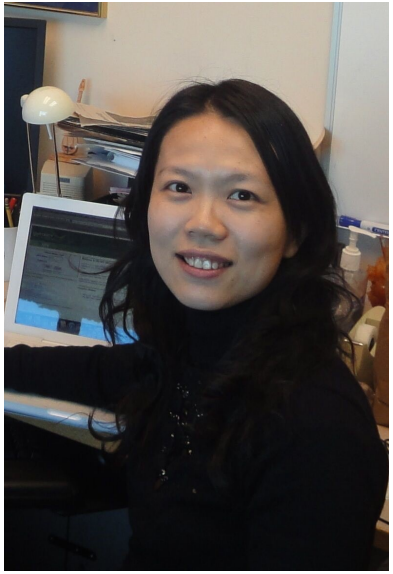

Google
DeepMind

48024 Applications Programming

Dr Angela Huo

Dr. Angela Huo

- **Subject Coordinator**, Applications Programming
- **Program Coordinator**, Bachelor of Computing Science, Major of Cybersecurity and Privacy
- **Site Coordinator**, ICPC South Pacific Divisional Finals 2020



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Zoom Manner

- Chat: Message the lecturer if something is wrong
- Icon: Slow down or faster?
    - When you have a question, click “Raise hand”, I will unmute you and you can speak
    - Vote for a poll, click “Yes” or “No”
- Padlet: https://padlet.com/angelahuo/appsprog
    - I will answer the posted questions at the end of the lecture.

“Publishing abusive, offensive, vilifying, discriminatory or harassing material online in any form WILL NOT be tolerated, and will lead to consequences and possibly exclusion from UTS.”

UTS Student Rules, Section 16 – Student misconduct and appealsLinks to an external site.

Subject Survey: Java

Question 1 – Multiple Choice — **138** of **380** answered

Before enrolling in this subject, what was your most recent educational experience with Java programming.

A	I passed 41039 Programming 1 at UTS.	**34%**
B	I passed 48023 Programming Fundamentals at UTS.	**50%**
C	I passed IPRG001 Programming Fundamentals at UTS College.	**1%**
D	I passed a Java programming subject at another university (not UTS).	**5%**
E	I passed a Java programming subject at TAFE and recently transferred to UTS.	**0%**
F	I passed a Java programming subject at a vocational training college (not TAFE, INSEARCH or another university).	**0%**
G	I learnt Java programming at High School.	**3%**
H	I don't know how to program with Java.	**5%**
I	Other - please explain below.	**5%**

Subject Survey: Python

Question 2 – Multiple Choice

136 of **380** answered

Before enrolling in this subject, what was your most recent educational experience with Python programming.

A	I passed 41039 Programming 1 at UTS.	31%
B	I passed a subject that introduces Python at UTS.	12%
C	I passed a Python programming subject at another university (not UTS).	2%
D	I passed a Python programming subject at TAFE and recently transferred to UTS.	0%
E	I passed a Python programming subject at a vocational training college (not TAFE, INSEARCH or another university).	0%
F	I learnt Python programming at High School.	8%
G	I don't know how to program with Python.	43%
H	Other - please explain below.	8%

Subject Survey: Experience

Question 4 – Multiple Choice

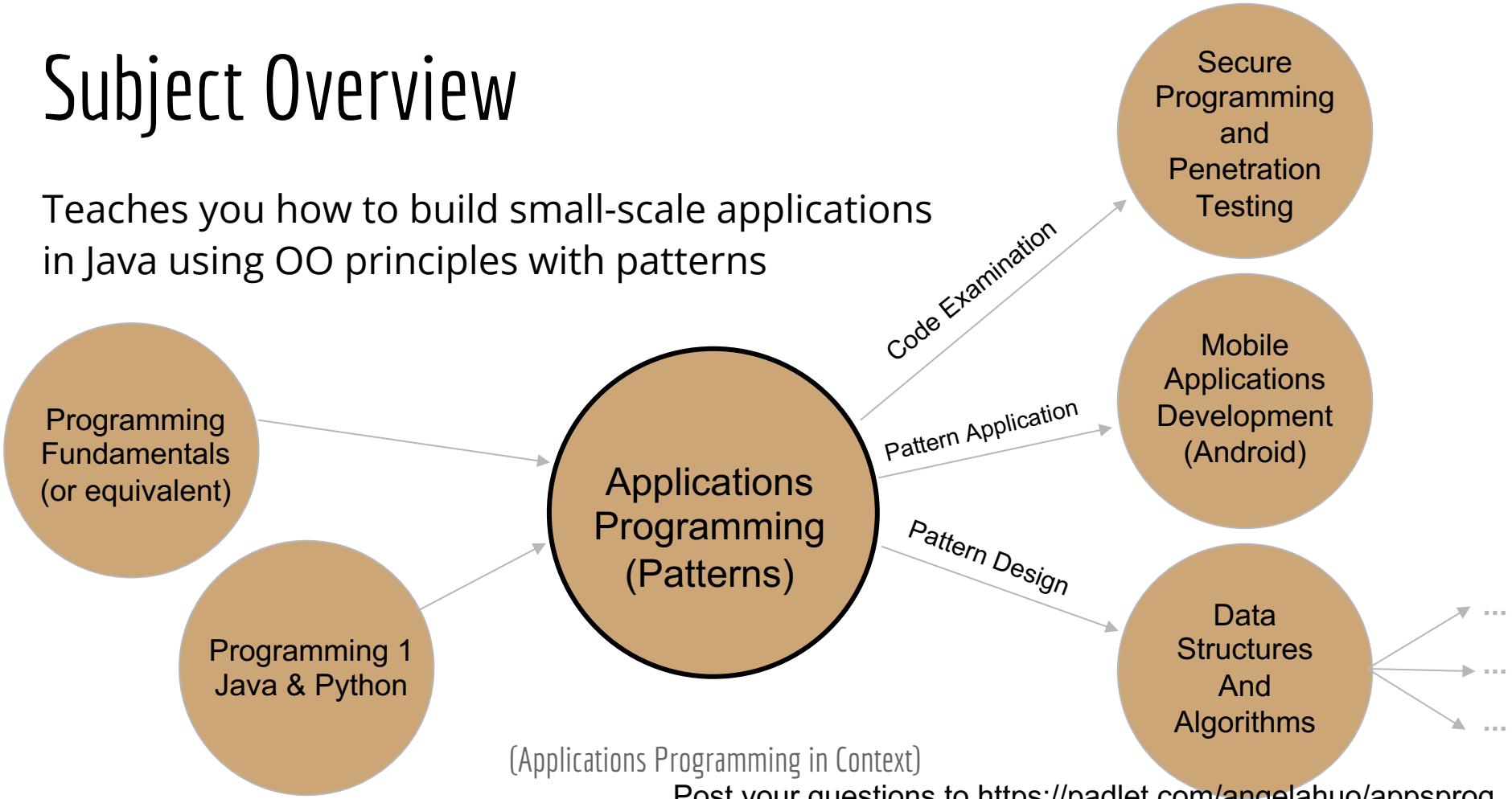
135 of **380** answered

Please choose the option below that best describes your past work experience as a programmer. If none of the descriptions fit exactly, choose the one that is closest.

A	I have no work experience as a programmer.	**88%**
B	I have previously been (or am currently) employed **part-time** as a programmer (**paid**).	**2%**
C	I have previously done (or am currently doing) some programming projects **part-time**, but it was **not paid work**.	**8%**
D	I have previously worked **full-time** as a programmer for **less than 2 years**.	**2%**
E	I have previously worked **full-time** as a programmer for **2 years or more**.	**0%**

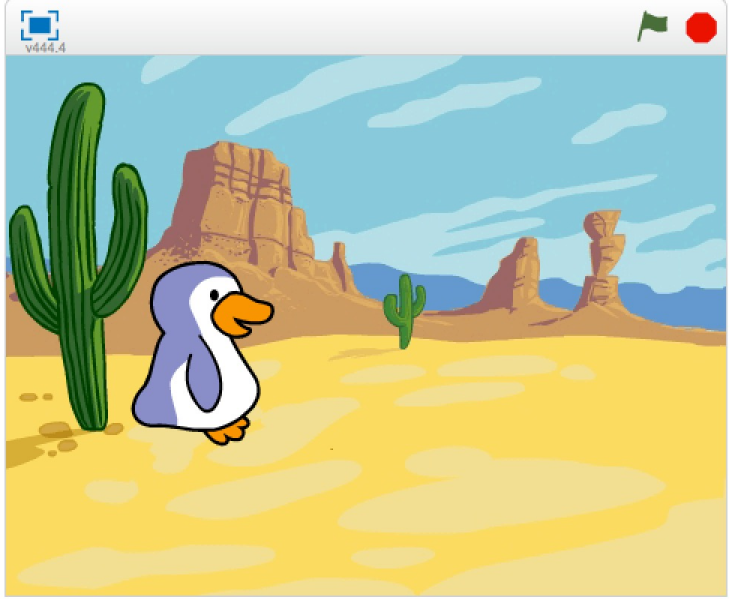
Subject Overview

Teaches you how to build small-scale applications in Java using OO principles with patterns



(Applications Programming in Context)

Post your questions to https://padlet.com/angelahuo/appsprog



Sprites

New sprite:

Stage
2 backdrops

New backdrop:

Sprite1

Scripts | Costumes | Sounds

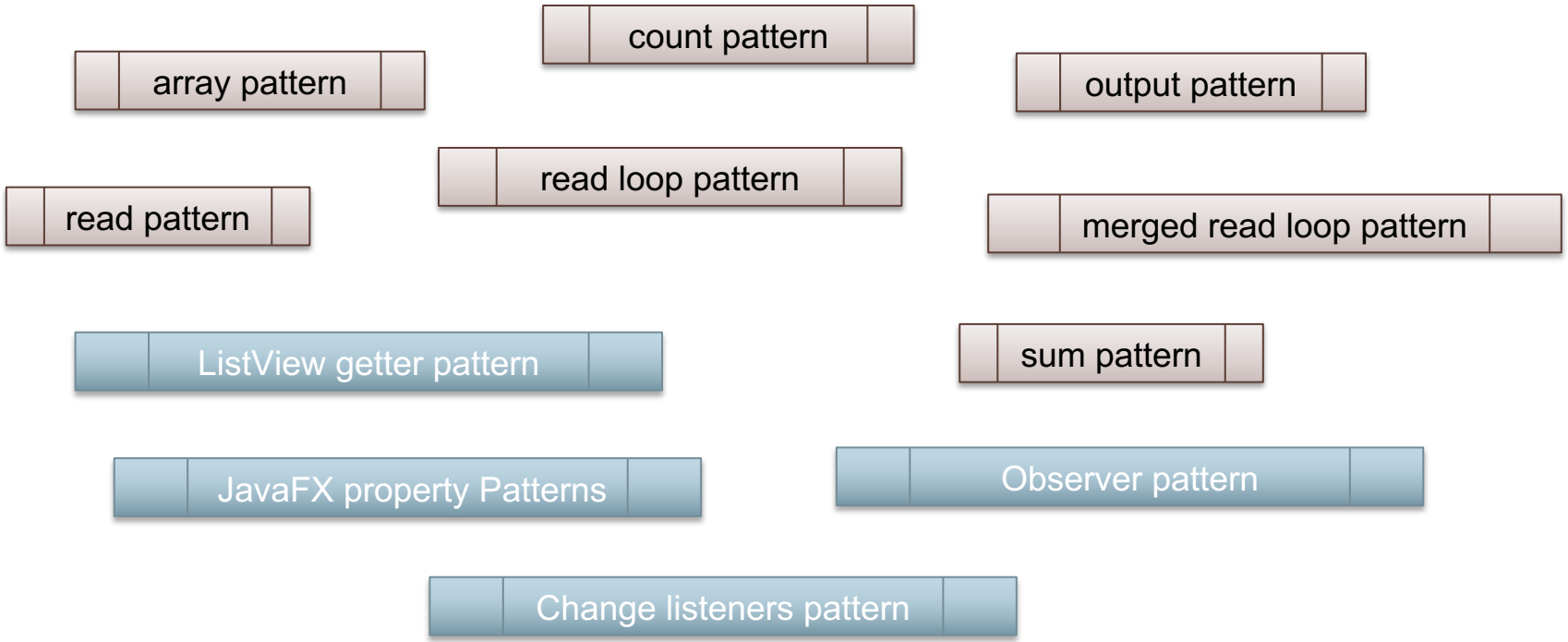
Motion | Looks | Sound | Pen | Data | Events | Control | Sensing | Operators | More Blocks

move 10 steps
turn 15 degrees
turn 15 degrees
point in direction 90
point towards
go to x: -109 y: -18
go to mouse-pointer
glide 1 secs to x: -109 y: -18
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
set rotation style left-right
x position

x: -108
y: -17

when clicked
point in direction 90
forever
play sound meow
move 10 steps
if touching edge ? then
turn 15 degrees

Patterns: Common solutions to common problems



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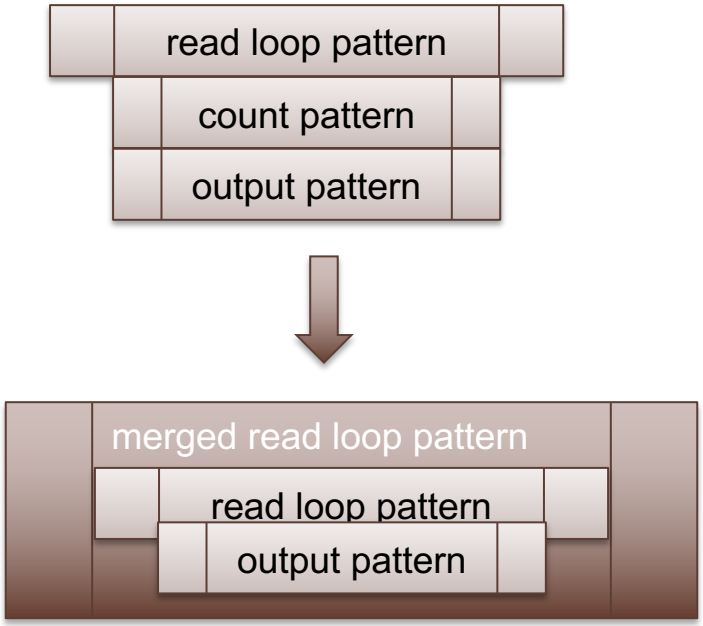
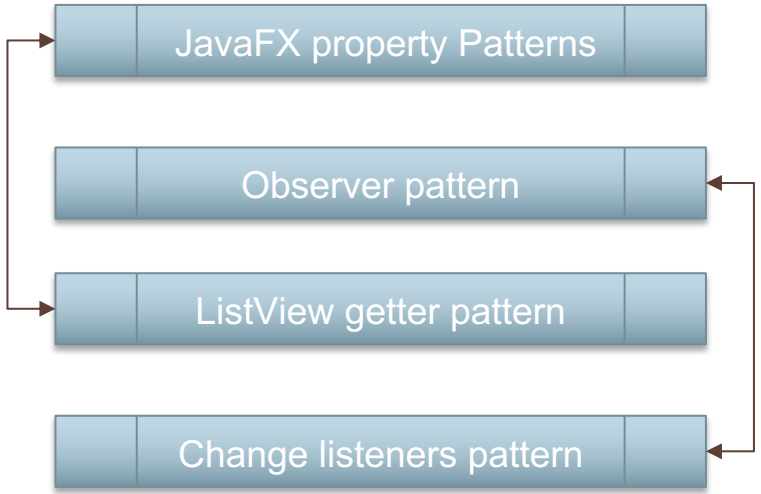
Programming with Patterns

Procedure programming
Object-oriented programming



MVC structure application



Post your questions to https://padlet.com/angelahuo/appsprog

What you will learn

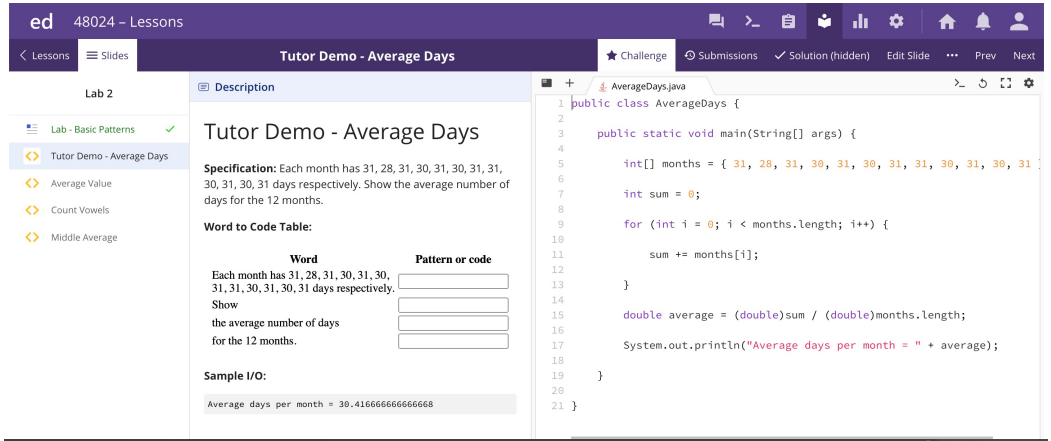
- More than syntax
- A process and methodology to follow
  - noun/verb/adjective analysis
  - class diagrams
  - system structure charts
  - Patterns to code
- Patterns: encapsulated code template
  - read, count, sum, read loop, output, max
  - any, none, every
  - lookup, menu
  - MVC

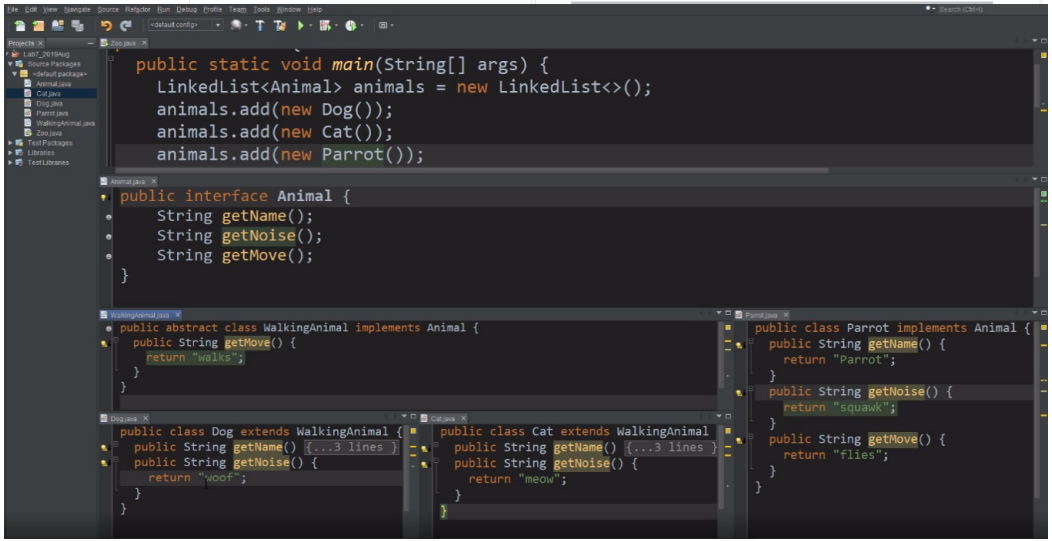
Post your questions to https://padlet.com/angelahuo/appsprog

What you will use

- **Java 1.8**
- **Python 3.6**

- **Week1-6 ED**
- **Week7-12 IDE**





https://www.uts.edu.au/current-students/current-students-information-faculty-engineering-and-it/software-download

Learning Objective

- **Before**

```
//Enrol in subjects
private void studentEnrol(LinkedList<Subject> subjects){
  System.out.println("Select a subject");

  for (Subject subject : subjects)
  System.out.println(subject.toString());
  int n = readSubjectNumber();
  int count = 0;
  for (Subject subject : subjects){
    if(subject.subjectNumber()==n){
      subject.showActivity();
      subject.selectActivity();
    }
    else {
      count++;
    }
  }
    if(count == subjects.size())
      System.out.println("No such subject");
}

private void studentWithdraw(){
  //method for studentWithdraw();
}

private char readStudentChoice(){
  System.out.print("Choice (v/e/w/x): ");
  return In.nextChar();
}
```

- **After**

```
public void enrol(Student student) {
        String code = readCode();
        List<Activity> activities = activities(code);
        if (activities.size() == 0)
                System.out.println("No such activity");
        else {
                for (Activity activity : activities)
                        if (activity.canEnrol()) {
                                student.enrol(activity);
                                return;
                        }
                System.out.println("No available seats");
        }
}
```

```
private String readGroup() {
        System.out.print("Group: ");
        return In.nextLine();
}
```

```
private void autoEnrol(Student student, String group) {
        for (Activity activity : activities) {
                if (activity.matches(number, group) && activity.canEnrol()) {
                        student.enrol(activity);
                        return;
                }
        }
}
```

Post your questions to https://padlet.com/angelahuo/appsprog

How we achieve?

	Previous Mon	----9~10 days----	Tuesday Lecture	----2~3 days----	Thu(Fri)
Materials	Pre-class(Canvas) • Study Module • Tutor demo Preview • Patterns book		Lab materials will be locked until the study module has been completed.		Lab(Canvas+ED) • Tutor Demo • Lab exercises

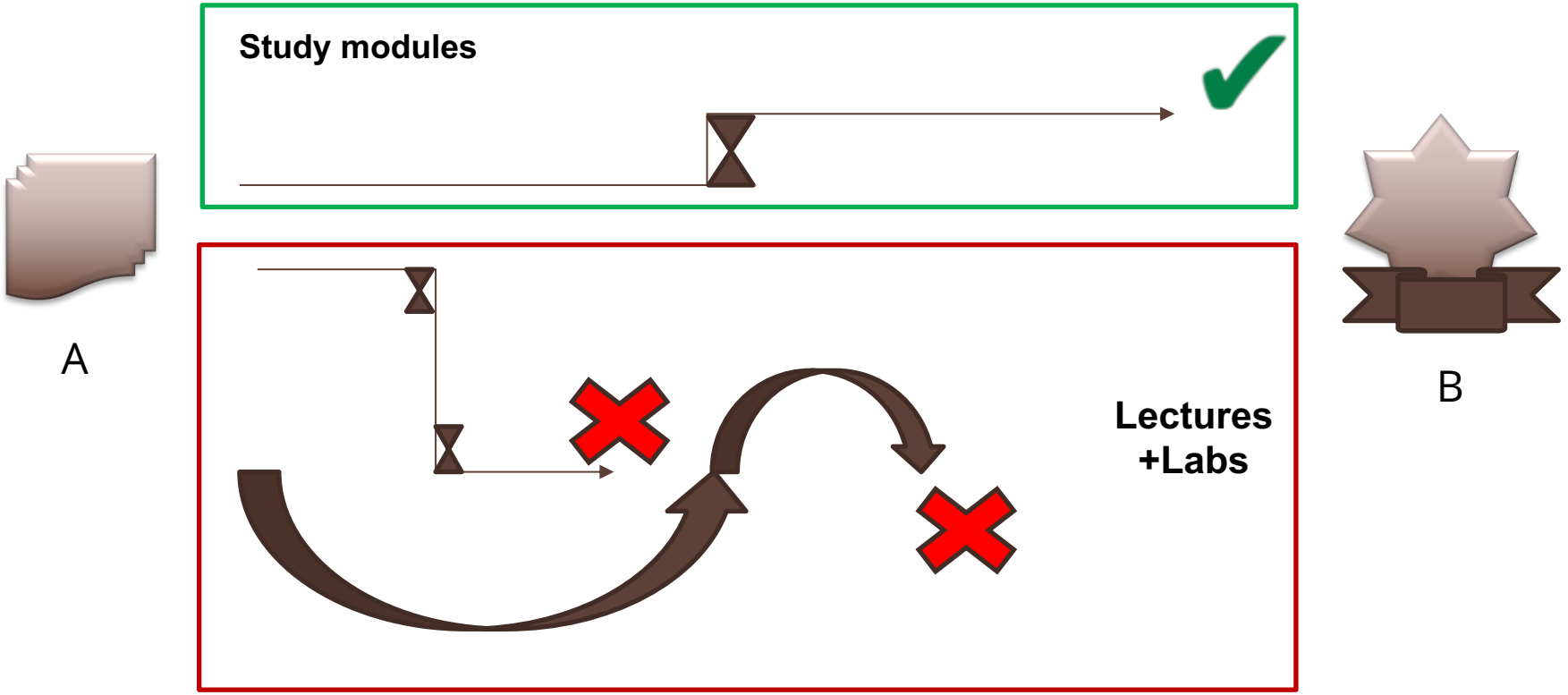
Activities			**Lecture:** Canvas-->Zoom
			Routine
			• Announcement
			• Study Module: Poll
			• Labs:
			  ◦ Review current
			  ◦ Preview next
			30 min break
			• Consultation@FLP
					Lab: Canvas-->Group
					On-campus Labs:
					• See "Tutor list"
					Online Labs(Group page):
					• BigBlueButton
					• Discussion Board

indicates the materials are released based on the teaching schedule.

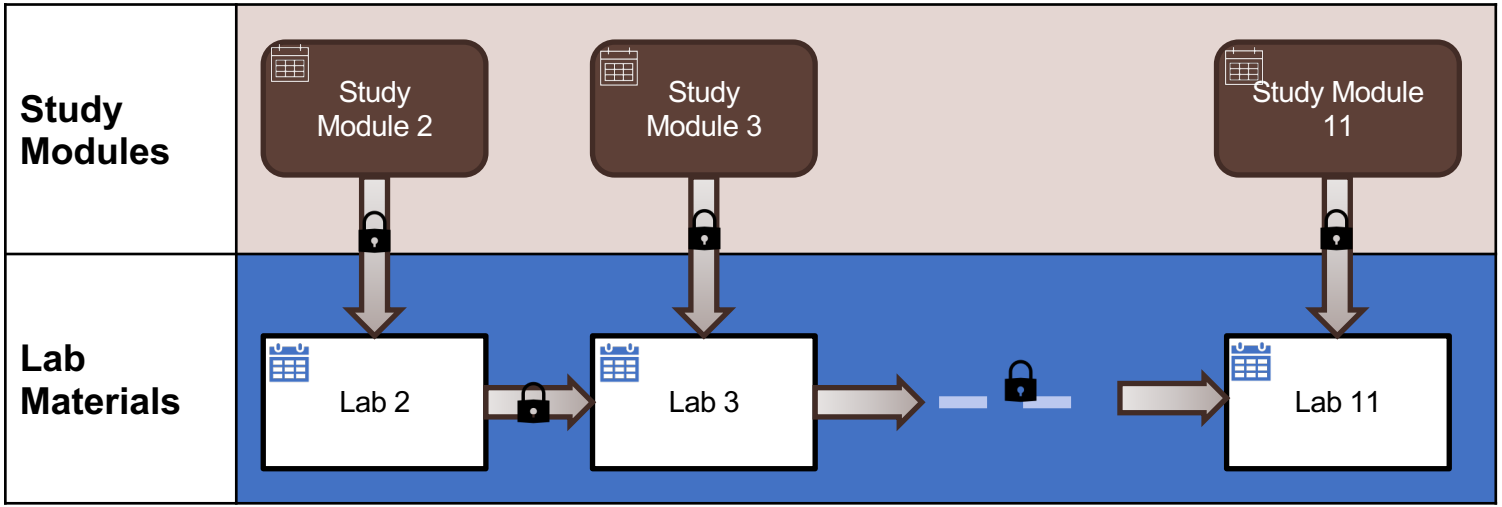
indicates the materials are locked until the required activities are completed.

Post your questions to https://padlet.com/angelahuo/appsprog

Why lectures and labs are important?



How you achieve?



Release Date:
Study Modules: 12:00 am on previous Monday
Lab Materials: the beginning of Lab class

Due Date:
Study Modules: 12:00 am on Lecture Tuesday
Lab Materials: one hour before the following lab begins

Post your questions to https://padlet.com/angelahuo/appsprog

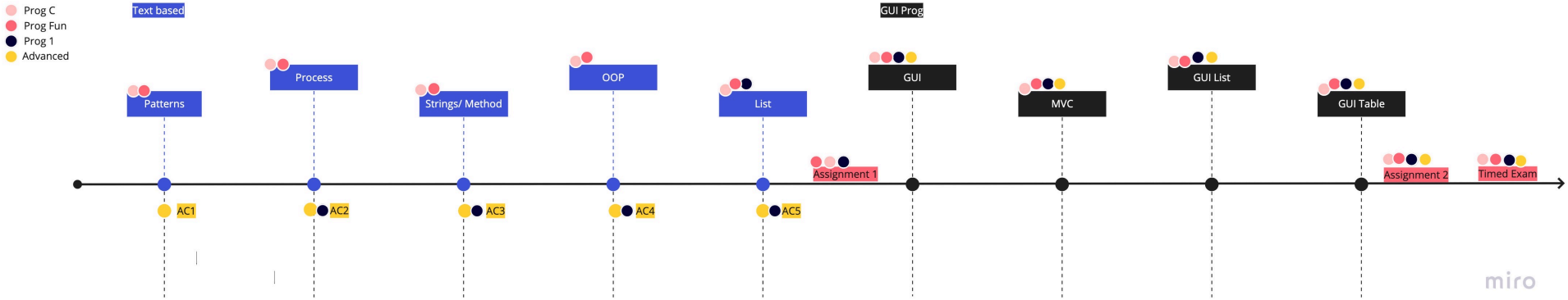
Time Schedule

Week	Monday (Materials in Canvas)	Tuesday (Lecture/Consultation)	Thursday-Friday (Lab Activities)		
1	M2:Basic Patterns	Feb-22	No Lab	Release Date	Due Date
2	M3:Basic Process	Feb-29	Lab 2	Advanced challenge 1	
3	M4:Methods and Strings	Mar-8	Lab 3	Advanced challenge 2	Lab2
4	M5:Classes	Mar-15	Lab 4	Advanced challenge 3	Lab3 2%
5	M6:Lists	Mar-22	Lab 5	Advanced challenge 4	Lab4 2%
6	M7:OOP	Mar-29	Lab 6	Advanced challenge 5	Lab5 2%
7	M8:GUIs and events	April-05	Lab7+ assignment support	Advanced challenge 6	Lab6 2%
StuVac		April-12 (Consultation)			
8	M9:MVC architecture	April--19 (Assignment 1 Due 35%)	Lab 8		Lab7 2%
9	M10:GUI lists	April-26	Lab 9		Lab8 2%
10	M11:GUI tables	May-3	Lab10		Lab9 2%
11	Sample quiz	May-10	Lab 11+ assignment support		Lab10
12		May-17 (Assignment 2 Due 25%)	Assignment Demonstration		Lab11
StuVac		May-24			
Exam		Timed LMS Exam 20%			Advanced challenges 6%

	Due date
	Holiday
	Attendance Required

Post your questions to https://padlet.com/angelahuo/appsprog

Assessments



- Pass>= 50% : Labs + 2 programming assessments
- Distinction>=75%: Labs + 2 programming assessments + exam
- H Distinction>=85%: Labs + 2 programming assessments + exam
- Full mark>=95%: Labs + 2 programming assessments + exam+ advanced challenges

Post your questions to https://padlet.com/angelahuo/appsprog

Preparation and participation

- **Labs:** Access to the lab material is electronically blocked until the student has completed the required weekly study module.

So it's important to complete each study module before coming to the lectures and the labs!

- **Programming assessments:** The programming assessment is a comprehensive project that combined all the skills practised in weekly labs.

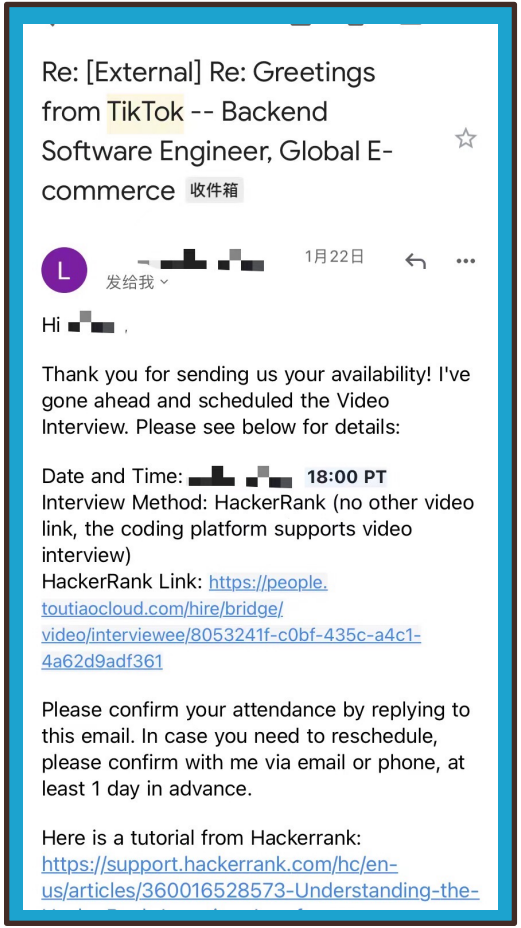
So it's important to complete the labs before attempting the programming assessments!

- **Timed LMS exam:** Feedback and reflection in lectures and las will be relevant to enhance the performance in the exam.

So it's important to attend the lectures and labs!

- **Advanced challenges:** The questions are designed for the interviews by Google, Facebook and other high tech companies.

So it's not that important for the students with different job objectives to work out the advanced challenges.



Re: [External] Re: Greetings from TikTok -- Backend Software Engineer, Global E-commerce 收件箱

L [redacted] 1月22日 发给我

Hi [redacted] ,

Thank you for sending us your availability! I've gone ahead and scheduled the Video Interview. Please see below for details:

Date and Time: [redacted] 18:00 PT
Interview Method: HackerRank (no other video link, the coding platform supports video interview)
HackerRank Link: https://people.toutiaocloud.com/hire/bridge/video/interviewee/8053241f-c0bf-435c-a4c1-4a62d9adf361

Please confirm your attendance by replying to this email. In case you need to reschedule, please confirm with me via email or phone, at least 1 day in advance.

Here is a tutorial from Hackerrank: https://support.hackerrank.com/hc/en-us/articles/360016528573-Understanding-the-

Post your questions to https://padlet.com/angelahuo/appsprog

Key to succeed in Assessments

- **All** assessment is **individual**
- **DO NOT rely on any code outside of the class!**
- **DO NOT skip any pre-class or class activities!**

Now that's clear...

- You may discuss ideas, approaches and problems, but you should write every line of code yourself except for code copied from **the lecture notes, lecture code or lab code.**
- You **MUST NOT** let another student see your solution code, and you **MUST NOT** look at another student's solution code.
- If you are having questions, talk to us! We're here to help.

Post your questions to https://padlet.com/angelahuo/appsprog

Supports

- From teachers:
  - **Lectures (comments, survey)**
  - **Labs**
  - **FAQ**
  - **Consultation** online booking page
- For Students:
  1. **FAQ**
  2. **Discussion Board**
  3. **Email your tutor**
  4. **Email the subject coordinator**
- U: PASS

U:PASS (UTS peer-assisted study success) is a study session where you work with a senior student and other students in the course to solve problems and learn the material in this subject. It is open to all students. Registration is required at the start of the semester, but usually, there is space available.

Post your questions to https://padlet.com/angelahuo/appsprog

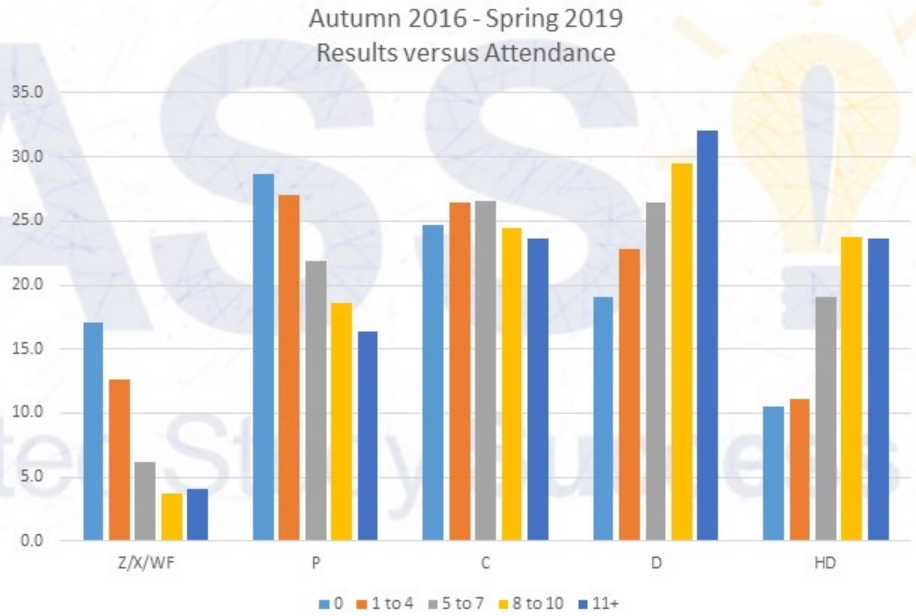
U:PASS
UTS Peer Assisted Study Success

It is a great environment for asking questions without getting the feeling of being judged
(U:PASS student, 2019)

- Do better (on average)
- Get help from other students
- Make friends
- Actually study

Session times:
www.tinyurl.com/upass2020

U:PASS film:
www.tinyurl.com/upassfilm



U:PASS
UTS Peer Assisted Study Success

Late Submission

- **Labs:** the due date is one hour before the following lab begins.
    - *You can access the lab after the due date, but the late submission won't be assessed.
- **Assignments:** the due date won't be extended unless under extenuating circumstances.
    - *Submission extension within one week will be granted automatically with a late penalty.
    - For any extension beyond one week, you will need to submit a Special Consideration following the Special Consideration process.

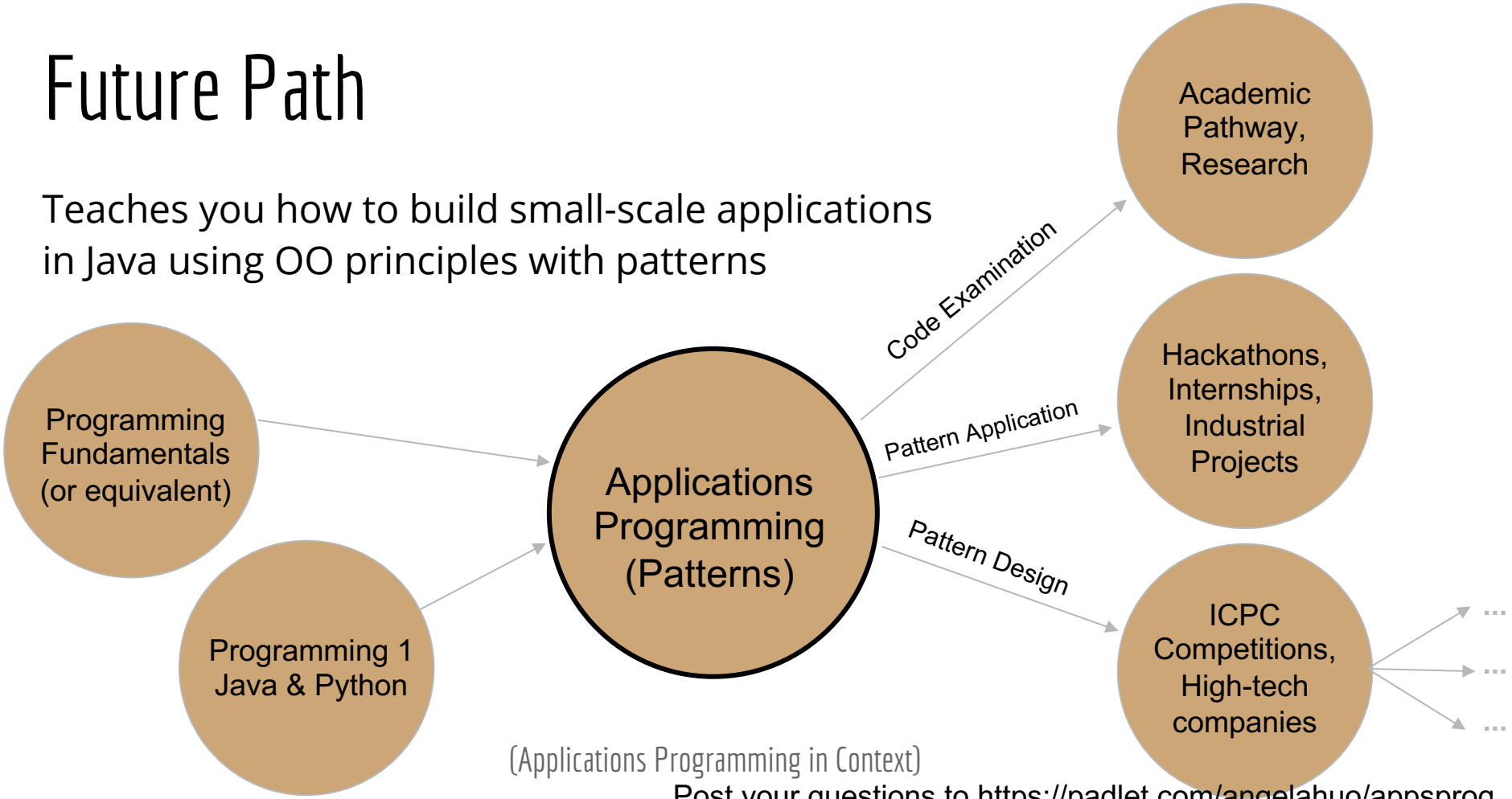
*Labs and assignments are built upon the solutions of the due labs and assignments, so any submission later than the release of the following lab or assignment won't be assessed.

Feedback

- From you:
  - Participate the lecture survey to let us know where we can improve
- From us:
  - Lab assessments 1-6, Assignment 1 and advanced challenges are marked by the system, so you get feedback on the correctness as soon as you submit a solution;
  - Lab assessment 7 and Assignment 2 use a GUI, so you cannot get instant feedback. Ask your lab assistant for informal early feedback on your lab solutions in lab activities; you can also ask your lab assistant for detailed feedback on your assignment solution after the due date.

Future Path

Teaches you how to build small-scale applications in Java using OO principles with patterns



(Applications Programming in Context)

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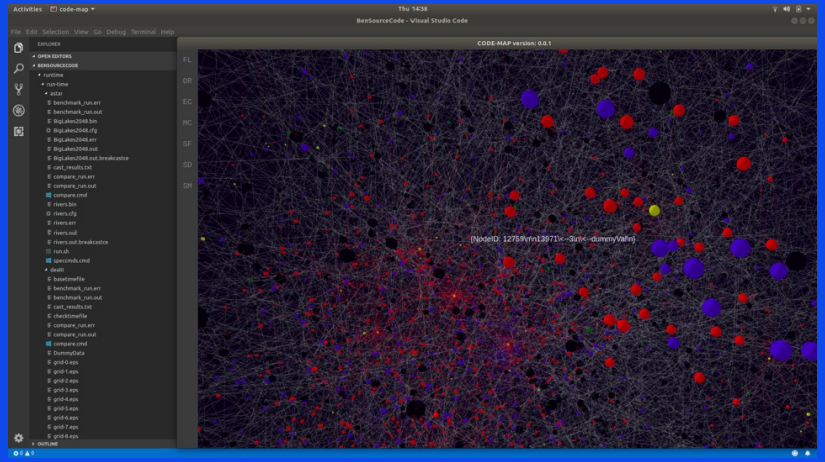
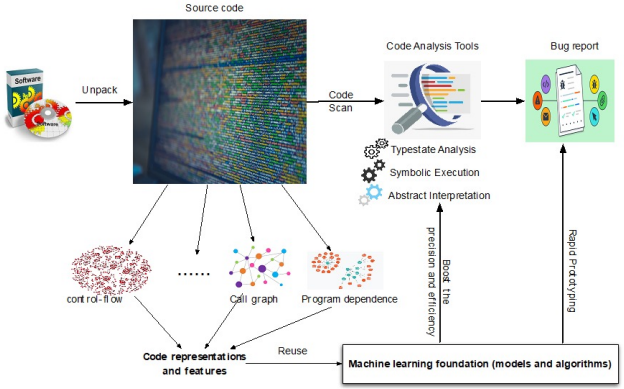
Real world projects

Program dependence graph of source code of OpenCV project (a computer vision library)



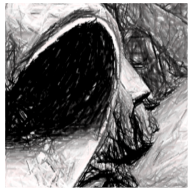
Software Security Analysis

Open-source tools: **SVF, WebSVF, PTABen, FSAM**



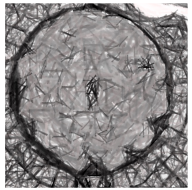
Used, cited and highly commented by **Cambridge University, Harvard, UIUC, UCSB, EPFL, NTU, Georgia Institute of Technology and University of Waterloo**

Post your questions to https://padlet.com/angelahuo/appsprog



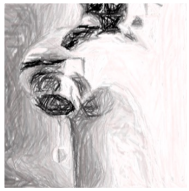
Predict water main bursts: helped more than 30 water utilities in the world

Broadband: predictive workforce and resource management for over 4 million homes and businesses.

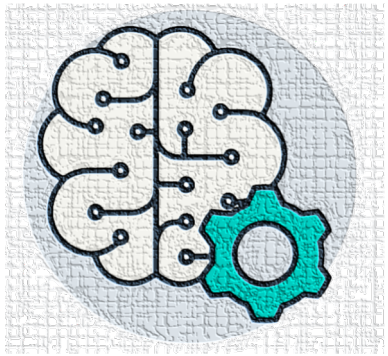


Sewer corrosion: Estimate the sewer corrosion rate across Sydney

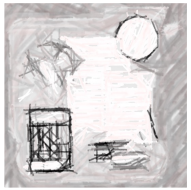
Water demand prediction: quality, sustainability, and social growth



Software Engineering Studio



Capstone Projects



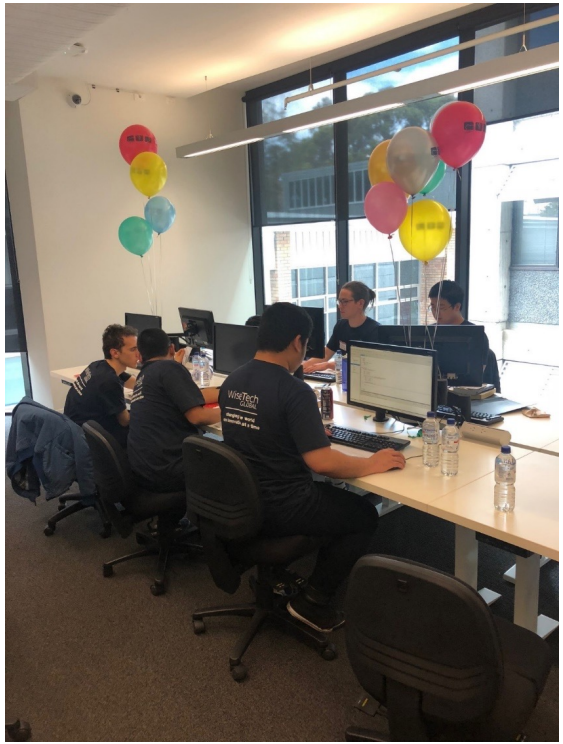
Cash flow prediction: prediction accuracy >99%

Structure health monitoring: awarded "The Most Practical SHM Solutions for Civil / Mechanical Systems Award" at IWSHM

Sensors data analysis: Deployed everywhere, IoT to influent everyone's life

Inventory planning: enable Acer to optimise its stock management

Post your questions to https://padlet.com/angelahuo/appsprog



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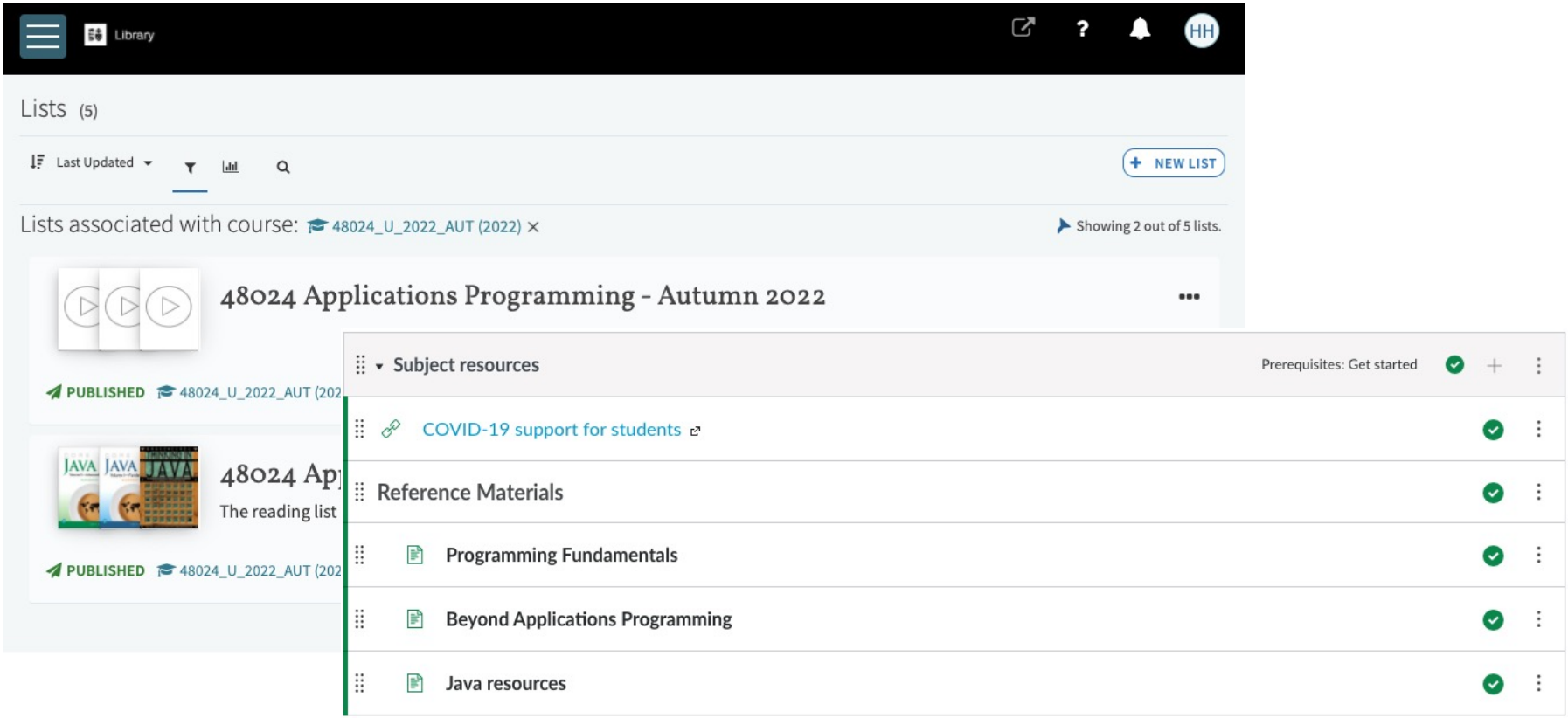
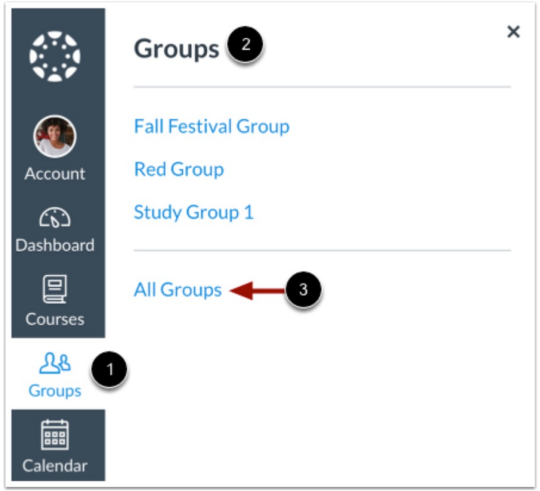
External Resources



What next?

- Get to know your tutor on Canvas
- Check your lab enrolment on Group Page
    - Do not enroll more than one lab session
    - If your lab group is different from the session number, contact the subject coordinator to change lab allocation.
- Make sure to switch on Canvas Notification

Open Groups



In Global Navigation, click the **Groups** link [1], then view your current groups [2]. To view all your groups, click the **All Groups** link [3].

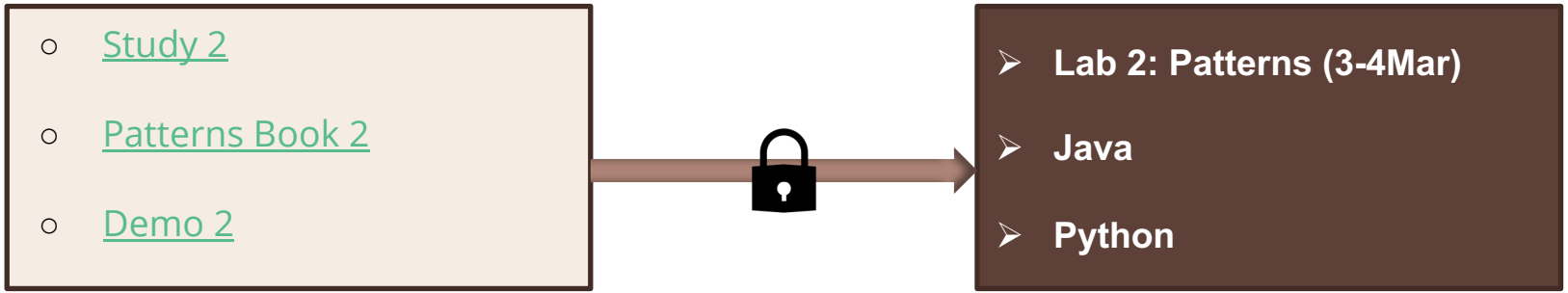
View Groups

Post your questions to https://padlet.com/angelahuo/appsprog

Learning activities for week 1:

Canvas:

- Get Started
- Week 0: Prior knowledge
- Week 1: Subject Overview
- Week 2: Pre-class activities



Next Week

- Lecture 2: Study 2 + Lab arrangement
- Lab 2
- Advanced challenge 1

See you next week!