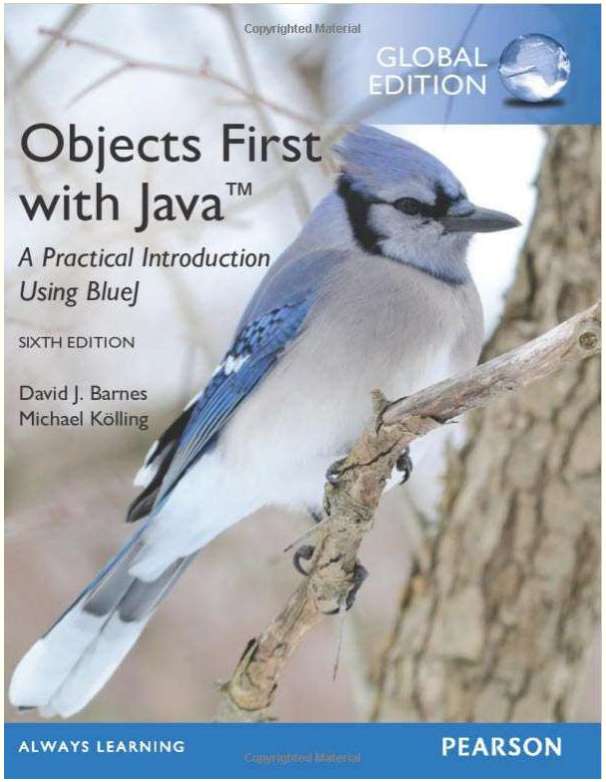
CO452 PROGRAMMING CONCEPTS

By Nicholas Day & Derek Peacock



Outline of Lesson

- Introduce the Module
- Introduce the Tutors
- Introduce Our Approach
- Assessment & Marking
- Demonstrate using Git
- Demonstrate using BlueJ
- Start the weeks Assessment
- Demonstrate Testing and Markdown

Learning Outcomes

Analyse a **simple requirement** in a structured manner in order to establish a strategy to solve the current problem

Design, document, implement and test reliable, **maintainable** programs as solutions to simple problems

Use structured techniques of design and implementation and **good documentation** practice

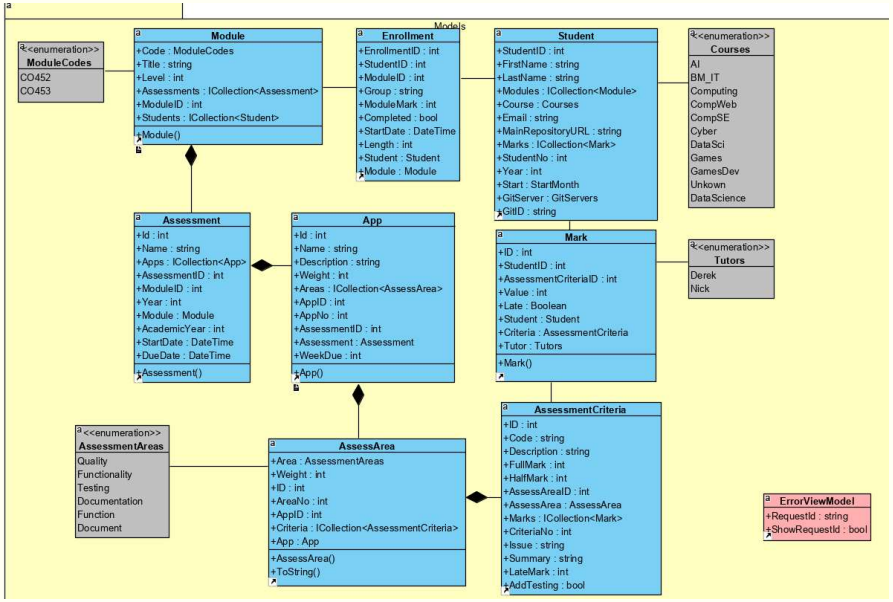
Make effective use of **software development tools** when implementing fit-for-purpose solutions

Nicholas Day – Short Bio

- Degree in Computing, PGCert in Teaching and Learning in Higher Education, PhD in Computer Science Education Research (CSEd)
- 11 years of programming experience; mainly in C++, C#, and Java
- 8 years of teaching experience; ranging from teaching introductory programming courses, to data structures and algorithms
- Post-PhD, the continuation and application of my research has led to the adoption of the flipped classroom approach – involving both the modification of modules and the production of video resources.

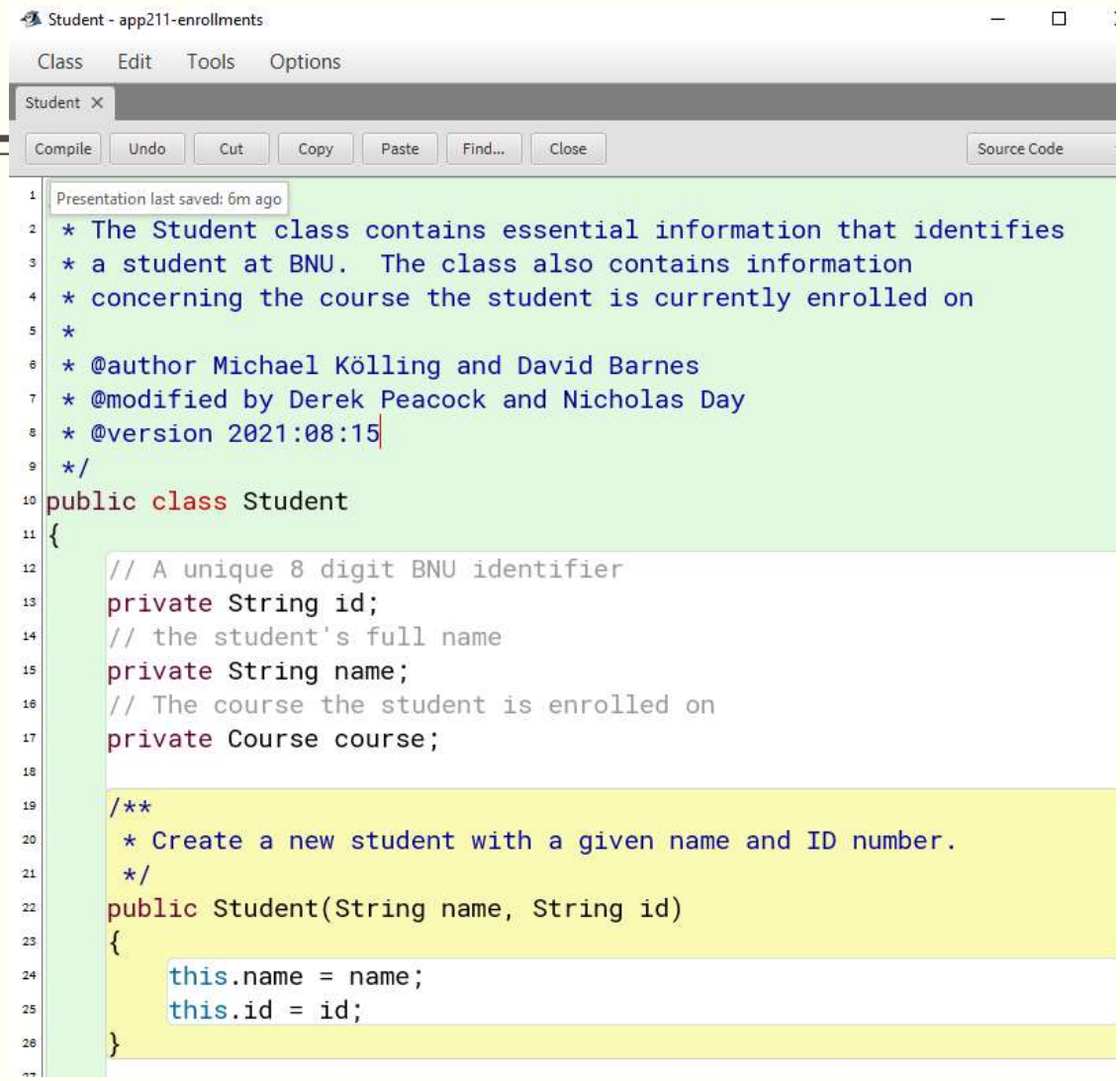
Derek Peacock – Short Bio

- Degree in Botany, PhD Plant Biochemistry
- 8 Years: Lecturer in Biochemistry,
  - Universities Durham, Sussex and Leicester
- 7 Years: Lecturer in Computing, (le.ac.uk)
- 28 Years: Lecturer in Computing (5 FE colleges)
- 50 Years Programming in 23 languages
- 38 Years Database Design (5 DBMS)
- 22 Years using CASE tools (UML)



Our Approach

- Professional Best Practice
  (see Code Complete & Clean Coder)
- Current In-Demand Job Skills
- Readable, simple and maintainable code
  - Good Names
  - Simple Methods
  - DRY (Do Not Repeat Yourself)
- Sound architecture
- Merciless Refactoring and Review



CO452 2021 – Content

- Java Programming Concepts
- Object-Oriented Focus – BlueJ Book
- Quality rather than Quantity
- Professional Tools -> IntelliJ, Java, Git, GitHub, Wiki pages & Visual Paradigm
- Assessment which simulates **agile** professional work practices.

CO452 Blended Face-to-Face & Online Lessons

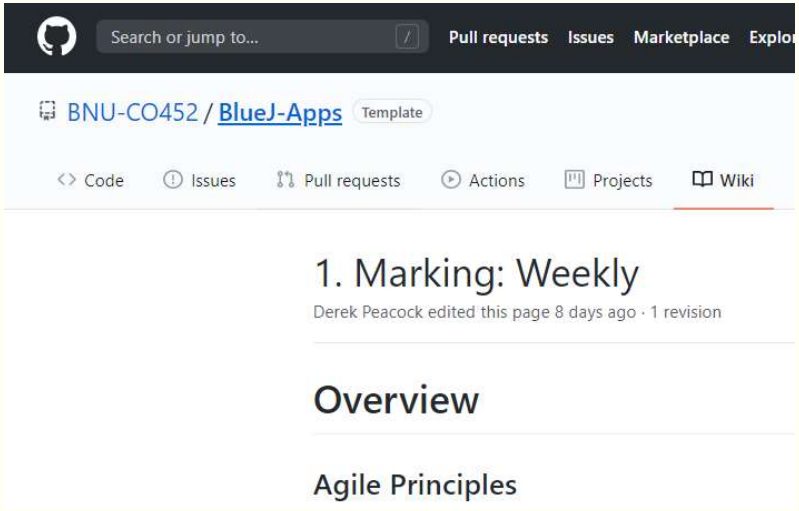
- Each week the pre-lesson Video & the BlueJ Book provide input
- The scheduled lessons are practical
  - Tutor demonstrations
  - Working through examples in one chapter
  - Getting started on the assessment
  - Students can/should help each other
  - Call on tutor when you get stuck
  - Tutor reviewing your weekly code
- Online 1:1 Help (Derek)
  - Can request 10 minute online meeting
  - Help available in set periods (times tba)
- Face-to-Face 1:1 Help (Nick)
  - Can request 10 minutes (times tba)

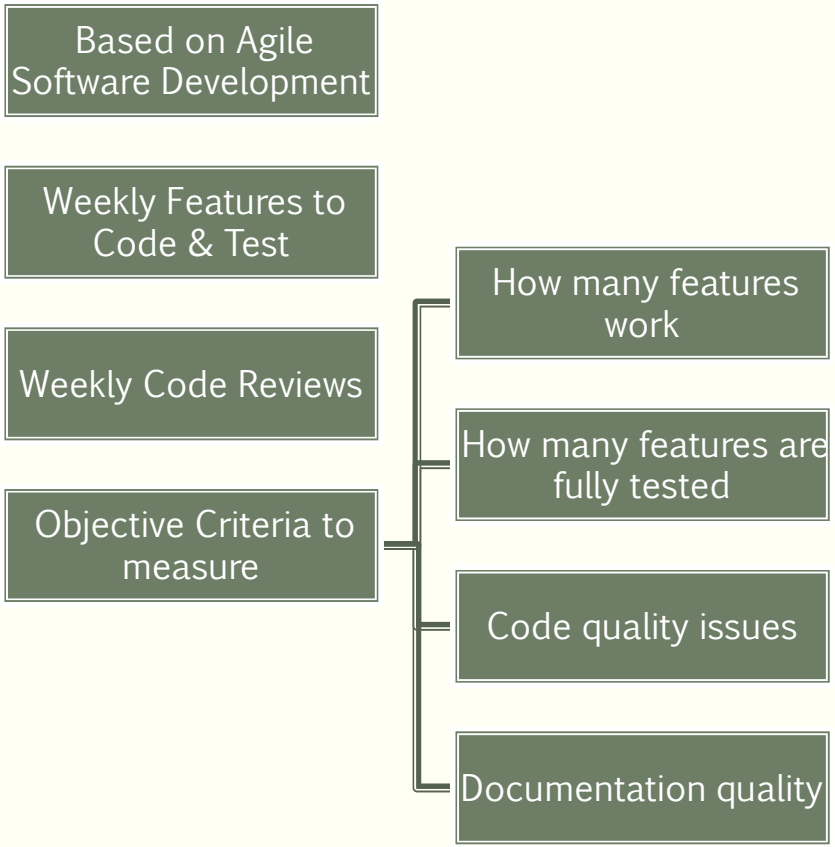
New Objective Assessment

This is explained more fully in the key GitHub template wiki you all must use

https://github.com/BNU-CO452/BlueJ-Apps/wiki/Agile-Marking

And YouYube video





Objective Marking System

- 6 Apps (Applications)
- 6 Deadlines
- 50% - Testing
- 30% - Quality (Clean Coding)
- 20% - Documentation

BNU Code Marking System

This system defines assessment marking criteria for modules that involve coding applications (Apps) using C# or Java.

Currently CO452 App02 Tickets has been filtered out by setting the due week to zero.

Learn about building Web apps with ASP.NET Core 5.0 MVC .

Listing of CO452 Apps

PK	Module	App	Description	Weight
2	CO452	App21-01 Enrolments	Students enrolling on a course	10%
3	CO452	App21-02 Grades	Converting module marks into grades	15%
4	CO452	App21-03 Products	Maintaining a list of products for sale	15%
5	CO452	App21-04 Stock	Adding a user interface to the products app	20%
15	CO452	App21-05 Songs	A time limited application	20%
6	CO452	App21-06 Zuul	Colossal Adventure type of console game	20%
			TOTAL WEIGHT =	**100%**

Simulation of Agile Practice

- Each App is like a “sprint” of 2-3 weeks.
- Working code produced by the deadline is the top priority.
- Simple quality code is better than “clever” complex code.
- If your App is late your marks for the app could be limited (40%) .
- If you are late you will not be ready for App05
- App05 must be completed in 3 hours in week 10

CO452 Module Scheme 2021

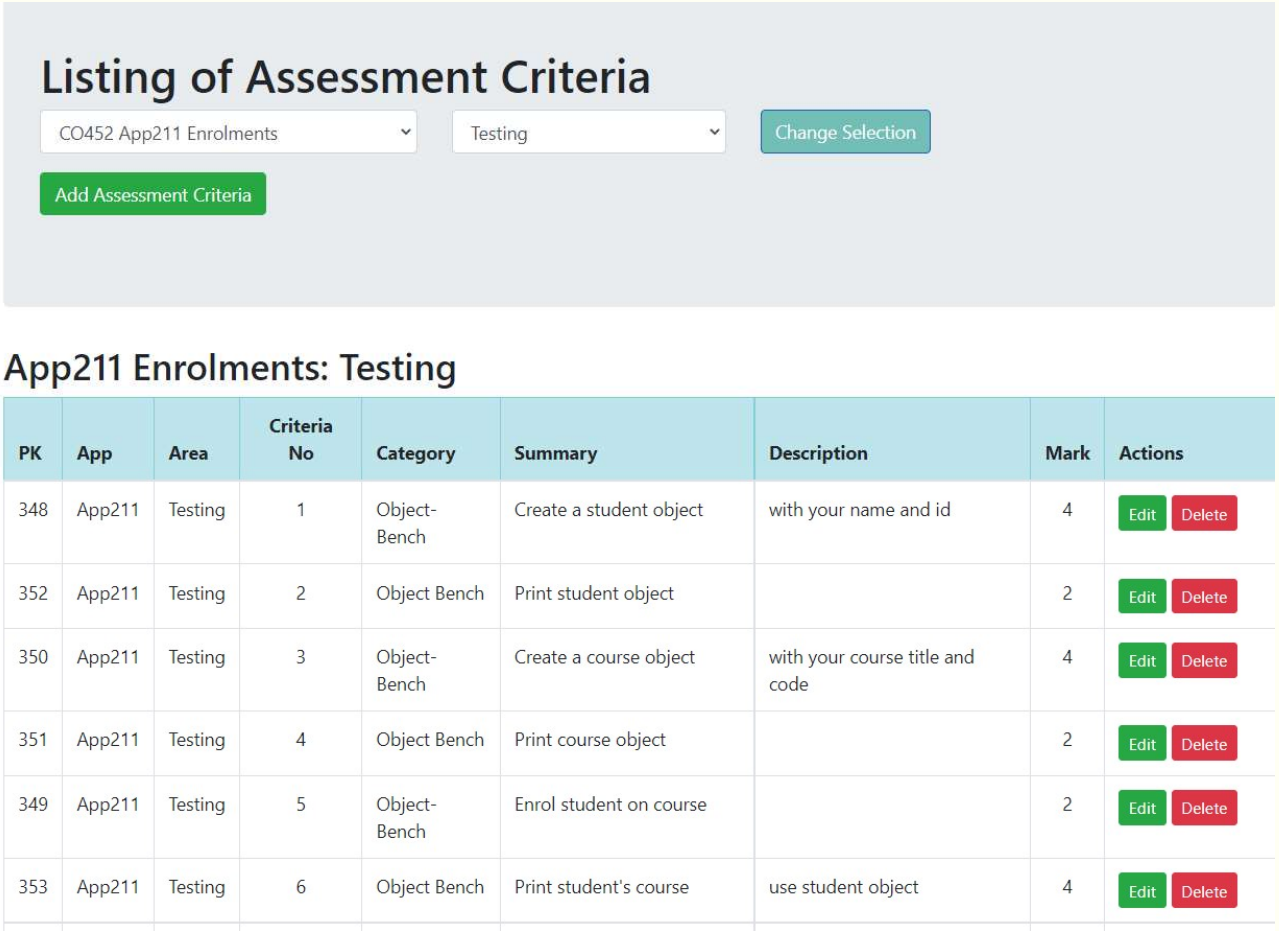
The core text book for module CO452 is - Barnes, D. and Kolling, M. (2017), *Objects-first in BlueJ: A Practical Introduction to Java*, 6th ed. Pearson

Week	Begin	Subject	App Start	Deadline
01	27 Sep	Classes and Objects part 1: Variables, Constants, Methods, Parameters, Output	app21-01-enrollments	
02	04 Oct	Classes and Objects part 2: Extending last week with more methods?		
03	11 Oct	Selection: if and switch, Enumerations	app21-02-grades	**app21-01-enrollments**
04	18 Oct	Iteration: for, for-each, while + ArrayLists		
05	25 Oct	app21-02-grades Workshop		
06	01 Nov	Collections: Another list?	app21-03-products	**app21-02-grades**
07	08 Nov	String lecture + app21-03-grades		
08	15 Nov	Main, User Interfaces and Input	app21-04-stock	**app21-03-products**
09	22 Nov	Arrays? Helpers? + app21-04 Workshop		
10	29 Nov	app21-05-songs		**app21-04-stock**

Testing – Limits your mark!

- If only 50% of the apps features work then the maximum mark = 50%

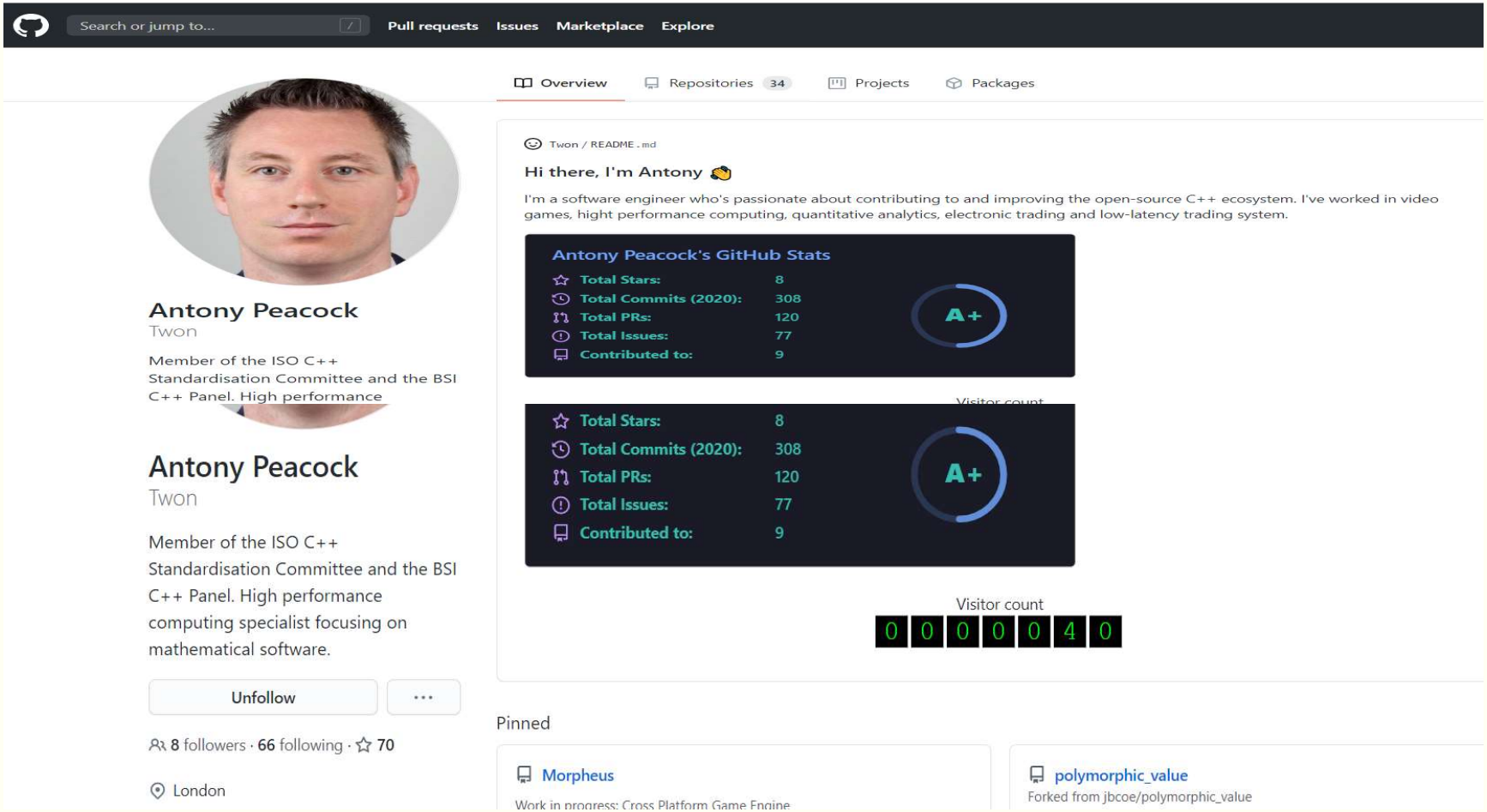
- In week 1 there are 14 tests to complete most on code you were given.
- Each test might only take 1 minute but must be recorded and put in your wiki.
- In the real world late delivery has serious penalties.
- Apps delivered late may only get 40% maximum.
- You can have a week to make improvements if on time.



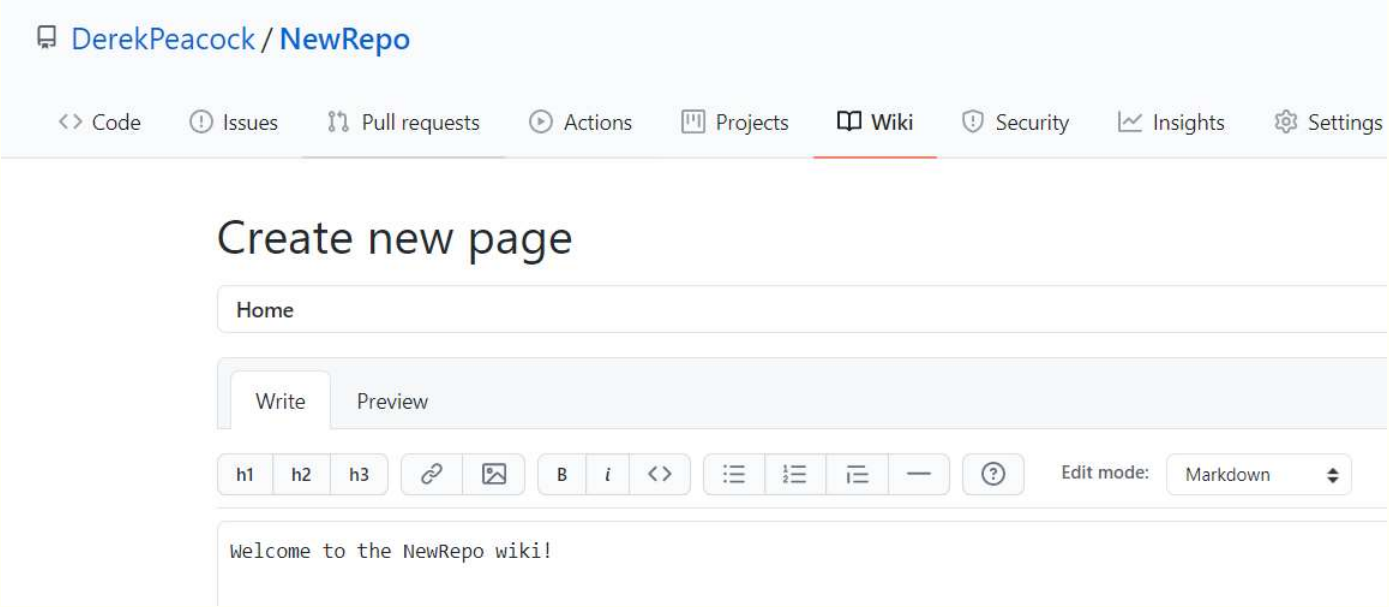
Today's Practical - GitHub

1. Create a GitHub account (personal email)
2. Goto https://github.com/BNU-CO452/BlueJ-Apps/wiki
3. Create a shortcut to this wiki
4. Go to <Code> in the menu
5. Create your public **BlueJ-Apps** repository by clicking on "Use this template"
6. Create your wiki home page by copying the Example Home Page (slides)
7. Give your tutor (bnu-cms)
    1. Your full name
    2. Your GitHub id

GitHub Profiles



How to Update your Wiki (using MarkDown)



- Create a new wiki page called **Home**
- Copy the example student home wiki page
- See markdownguide.org
- See wiki video

https://github.com/BNU-CO452/BlueJ-Apps/wiki/Student-Home-Page.md

Student Name: Home Page

Student ID: {21900000}

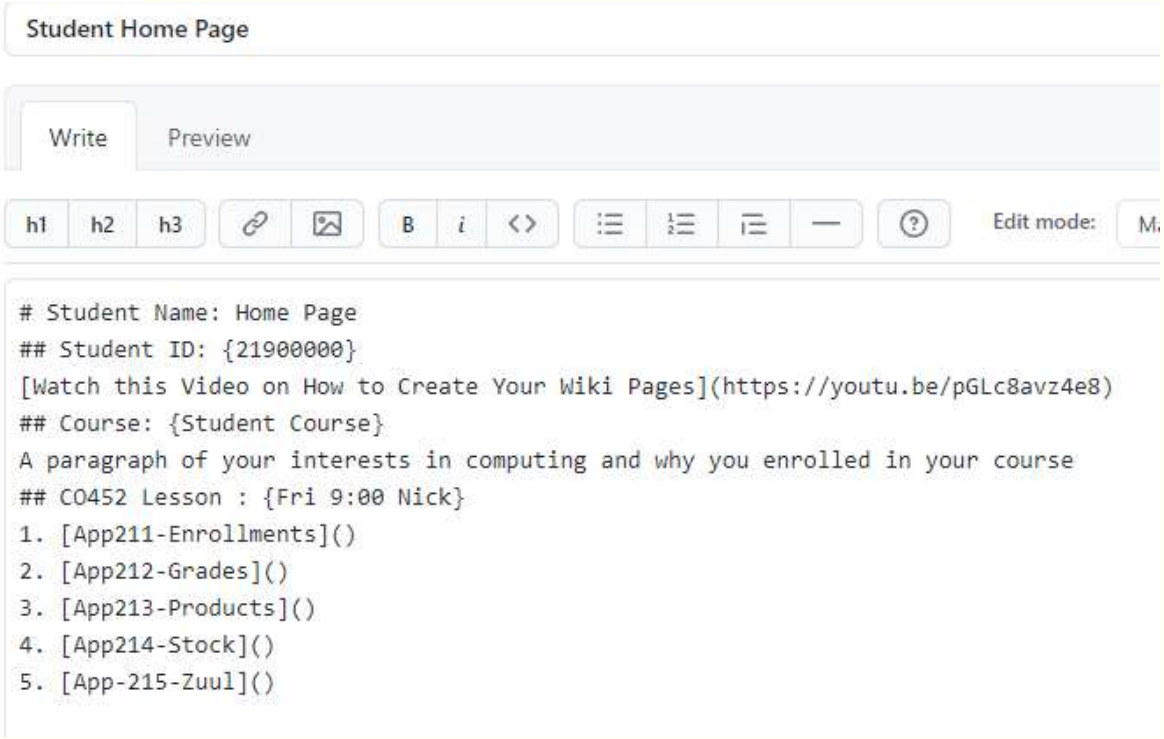
Watch this Video on How to Create Your Wiki Pages

Course: {Student Course}

A paragraph of your interests in computing and why you enrolled in your

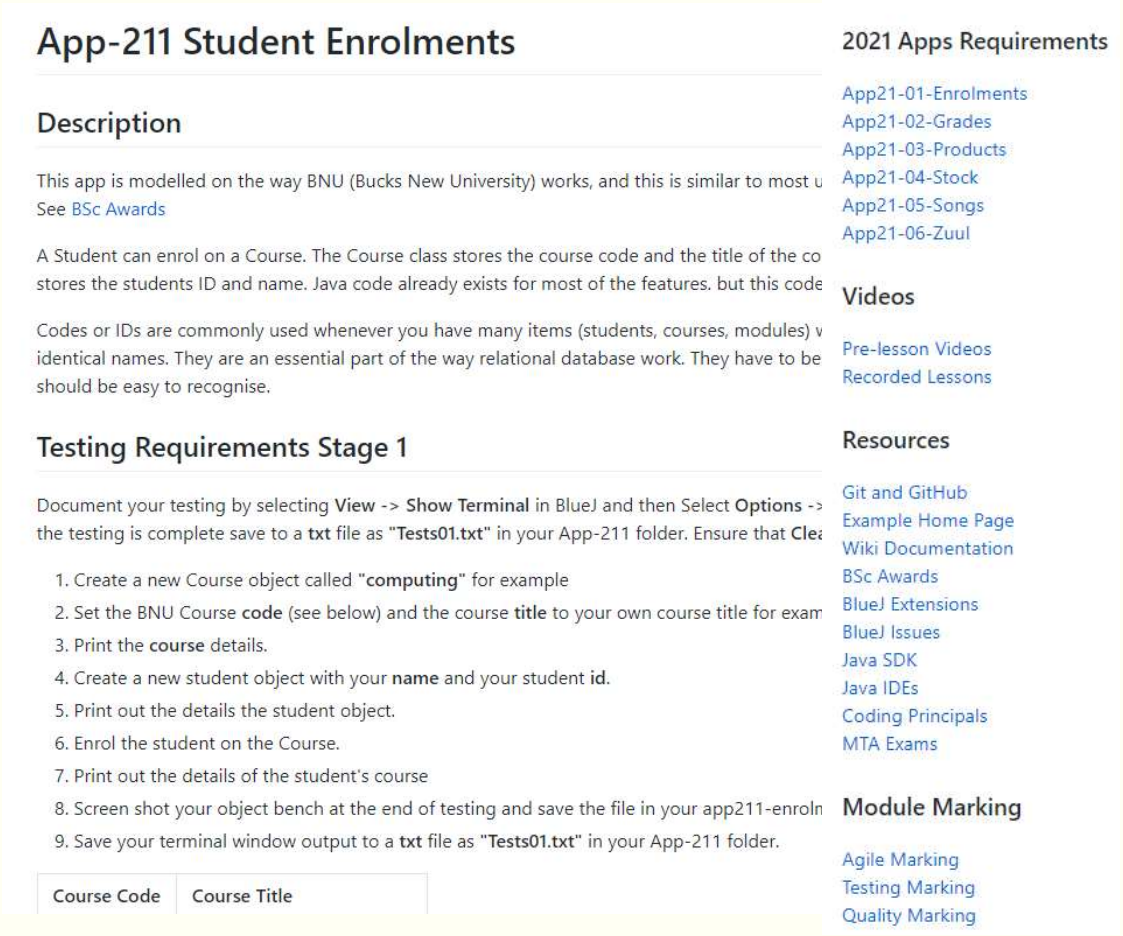
CO452 Lesson : {Fri 9:00 Nick}

1. App21-01-Enrollments
2. App21-02-Grades
3. App21-03-Products
4. App21-04-Stock
5. App21-05-Songs
6. App21-06-Zuul



Application Documentation – GitHub Wiki Pages

- This will include:-
  - Brief description of the app
  - Required features
  - Design
  - Testing
  - Evaluation
- Design is created by BlueJ & UML
- Description and Features can be copied from the wiki template
- Testing & evaluation needs adding to your repository & wiki



App-211 Student Enrolments

Description

This app is modelled on the way BNU (Bucks New University) works, and this is similar to most u
See BSc Awards

A Student can enrol on a Course. The Course class stores the course code and the title of the co
stores the students ID and name. Java code already exists for most of the features. but this code

Codes or IDs are commonly used whenever you have many items (students, courses, modules) v
identical names. They are an essential part of the way relational database work. They have to be
should be easy to recognise.

Testing Requirements Stage 1

Document your testing by selecting **View** -> **Show Terminal** in BlueJ and then Select **Options** ->
the testing is complete save to a **txt** file as "**Tests01.txt**" in your App-211 folder. Ensure that **Clea**

1. Create a new Course object called "**computing**" for example
2. Set the BNU Course **code** (see below) and the course **title** to your own course title for exam
3. Print the **course** details.
4. Create a new student object with your **name** and your student **id**.
5. Print out the details the student object.
6. Enrol the student on the Course.
7. Print out the details of the student's course
8. Screen shot your object bench at the end of testing and save the file in your app211-enroln
9. Save your terminal window output to a **txt** file as "**Tests01.txt**" in your App-211 folder.

Course Code	Course Title

CO452 Module Index

Module Scheme

2021 Apps Requirements

App21-01-Enrolments
App21-02-Grades
App21-03-Products
App21-04-Stock
App21-05-Songs
App21-06-Zuul

Videos

Pre-lesson Videos
Recorded Lessons

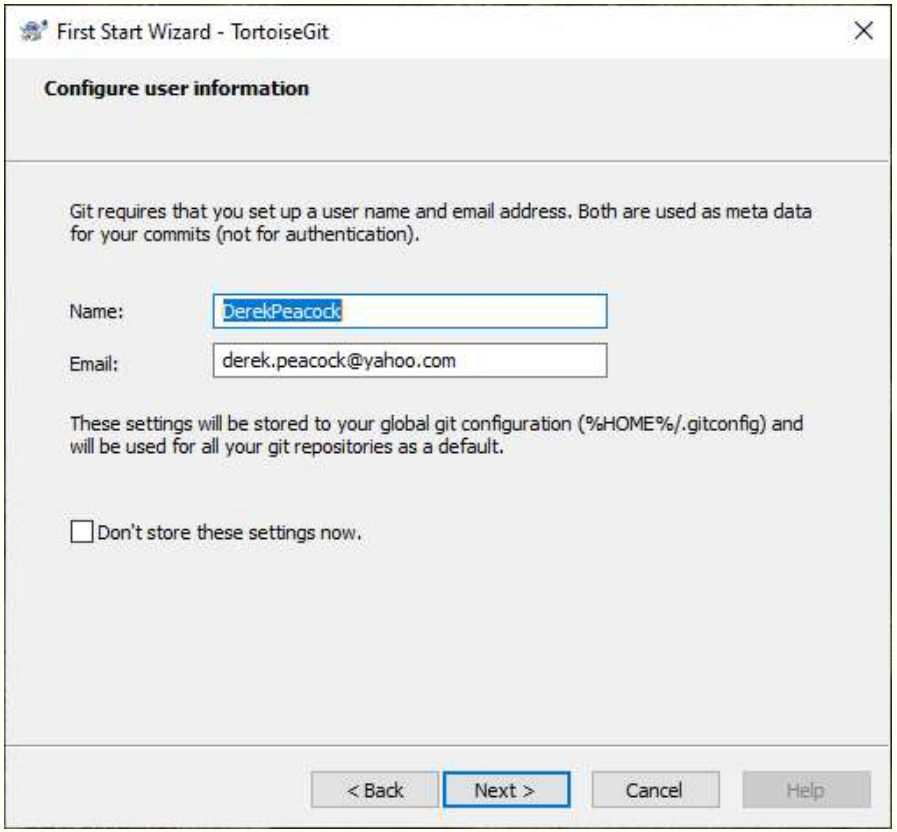
Resources

Git and GitHub
Example Home Page
Wiki Documentation
BSc Awards
BlueJ Extensions
BlueJ Issues
Java SDK
Java IDEs
Coding Principals
MTA Exams

Module Marking

Agile Marking
Testing Marking
Quality Marking

Demonstration of Tortoise Git -> Cloning



- Run Tortoise First Start, enter your name and email address
- Or right click TortoiseGit -> Settings
- Create an empty folder called repos
- Goto GitHub and copy the remote repository HTTPS URL
- In the repos folder right click and select Tortoise Clone, paste in the URL

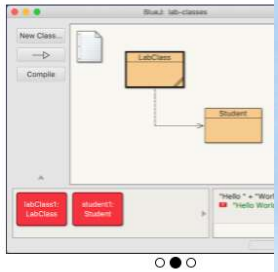
Download & Install BlueJ (at home)

Documentation

BlueJ

A free Java Development Environment designed for beginners, used by millions worldwide. Find out more...

"One of my favourite IDEs out there is BlueJ"
— James Gosling, creator of Java.



Created by KING'S College LONDON

Supported by ORACLE

Download and Install

Version 5.0.2, released 6 August 2021 (fixes crash on launch and minor bugs, and more)

Windows	Mac OS X	Ubuntu/Debian	Other
Requires 64-bit Windows, Windows 7 or later. Also available: Standalone zip suitable for USB drives.	Requires OS X 10.11 or later.	Requires 64-bit, Debian buster or Ubuntu 18.10 or later.	Please read the Installation instructions. (Works on most platforms with Java/JavaFX 11 support).

BlueJ: Short Video Tutorials

We have provided short video tutorials to support beginner in some common topics on how to use BlueJ.

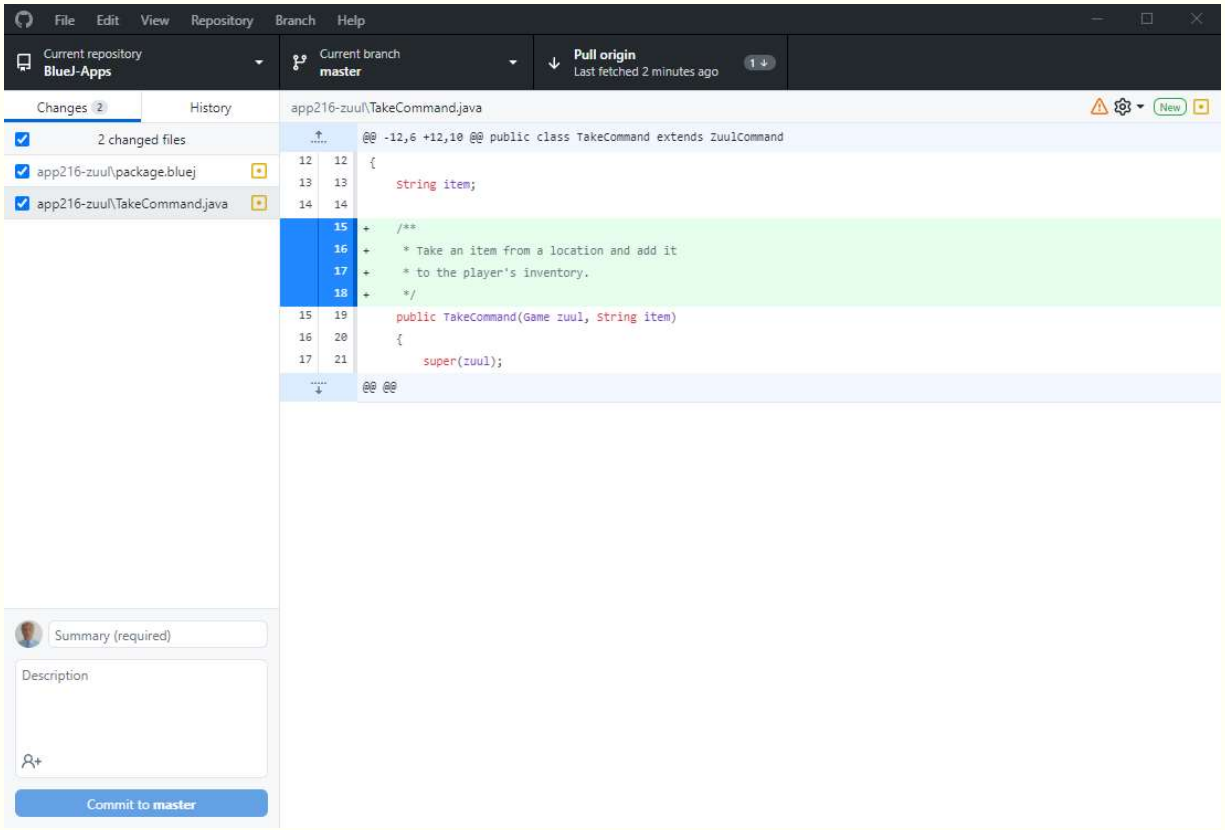
Contents

1. How to Install BlueJ
2. How to Change the Interface Language
3. How to use the Debugger
4. How to Reset the JVM
5. How to Open and Save Projects

1. How to Install BlueJ

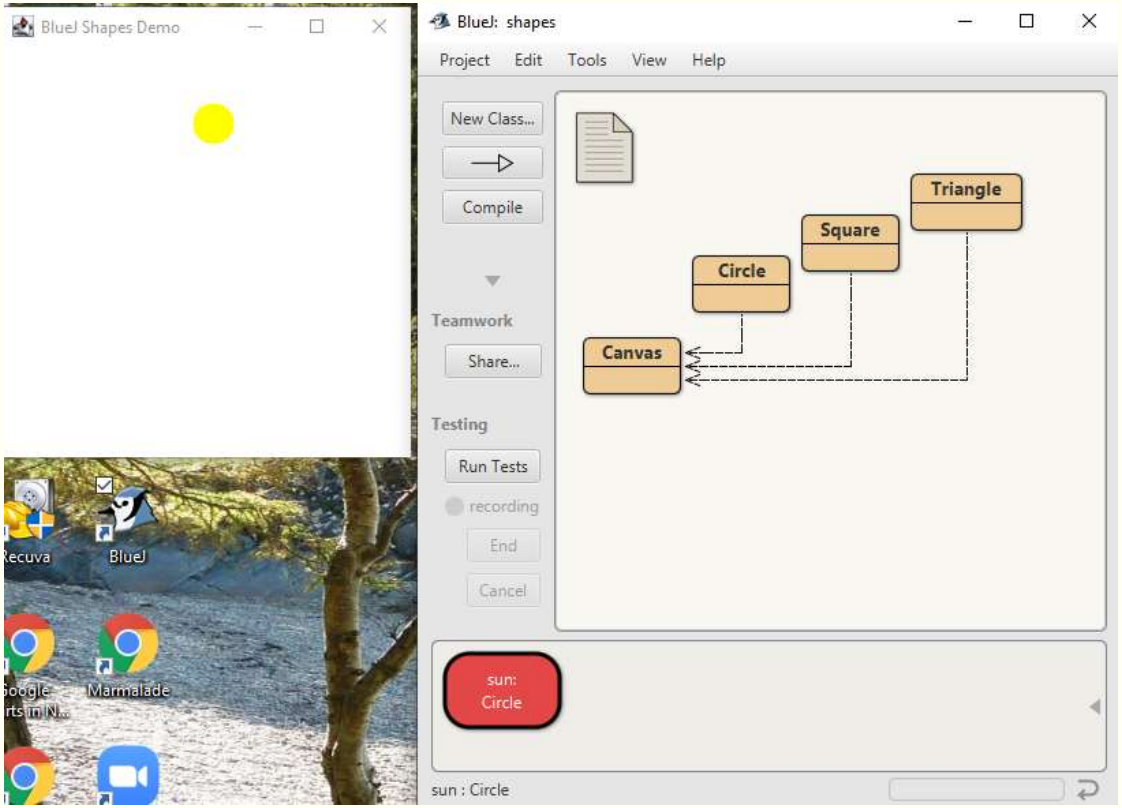
Download and Install GitHub Desktop (at home)

- See CO452-BNU\BlueJ-Apps readme
- Easy to use git gui
- Integrates with GitHub
- Also see BlueJ-Apps wiki



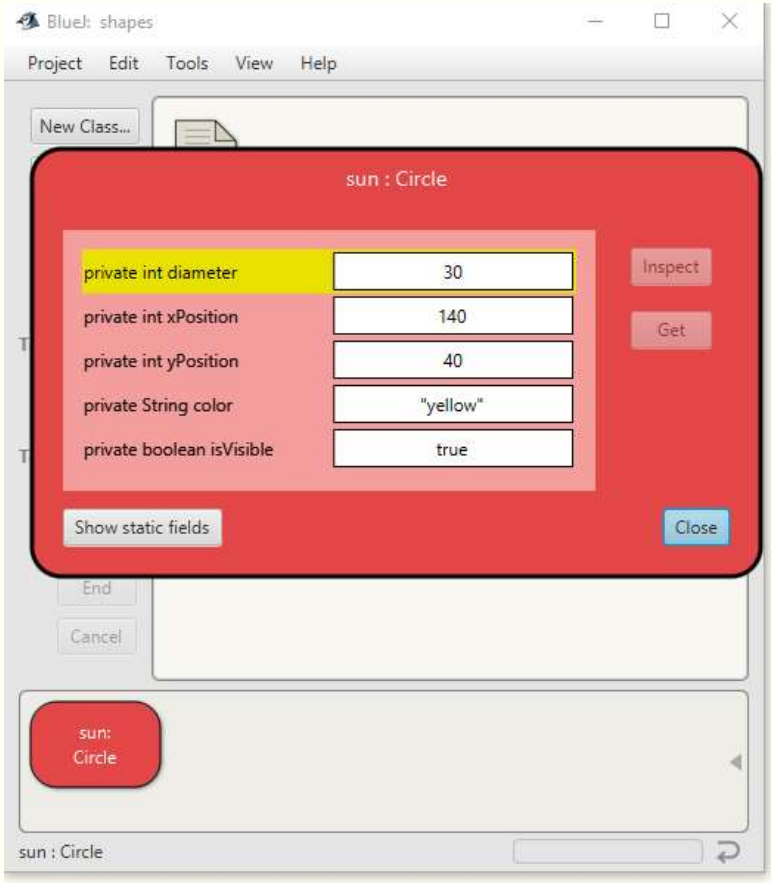
Practice – BlueJ Objects Part 1

- Open the shapes project.
- Create a new circle **object** called sun.
- Right click on the sun and call the makeVisible() **method**.
- Call the moveRight() method.
- Call the moveUp() method
- Call the moveHorizontal(100)
- Call changeColor("yellow")
- Values in () are called **parameters**



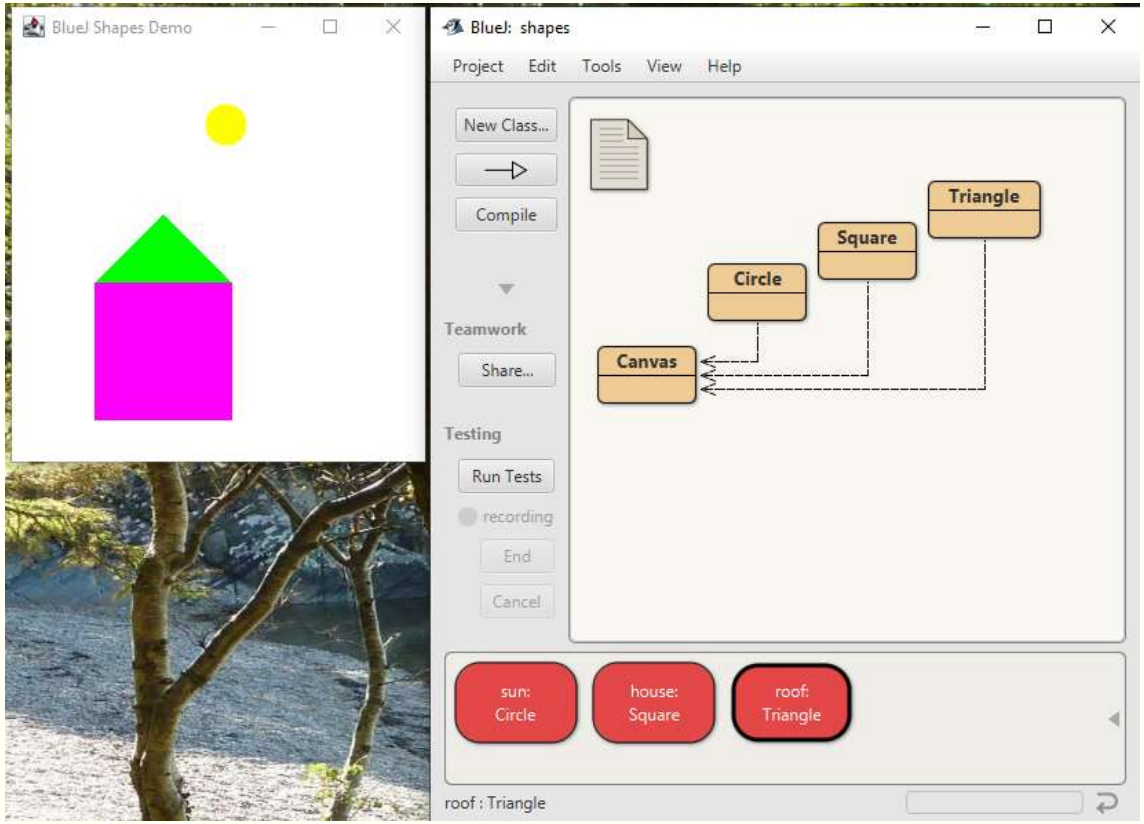
Practice – BlueJ Objects Part 2

- Inspect the sun object
- It contains **data values** of various types
- Int (whole numbers), String (text values), boolean true/false.
- diameter is a **variable/attribute**.
- Create a square house
- Create a triangle roof
- Use methods to arrange them into a picture.

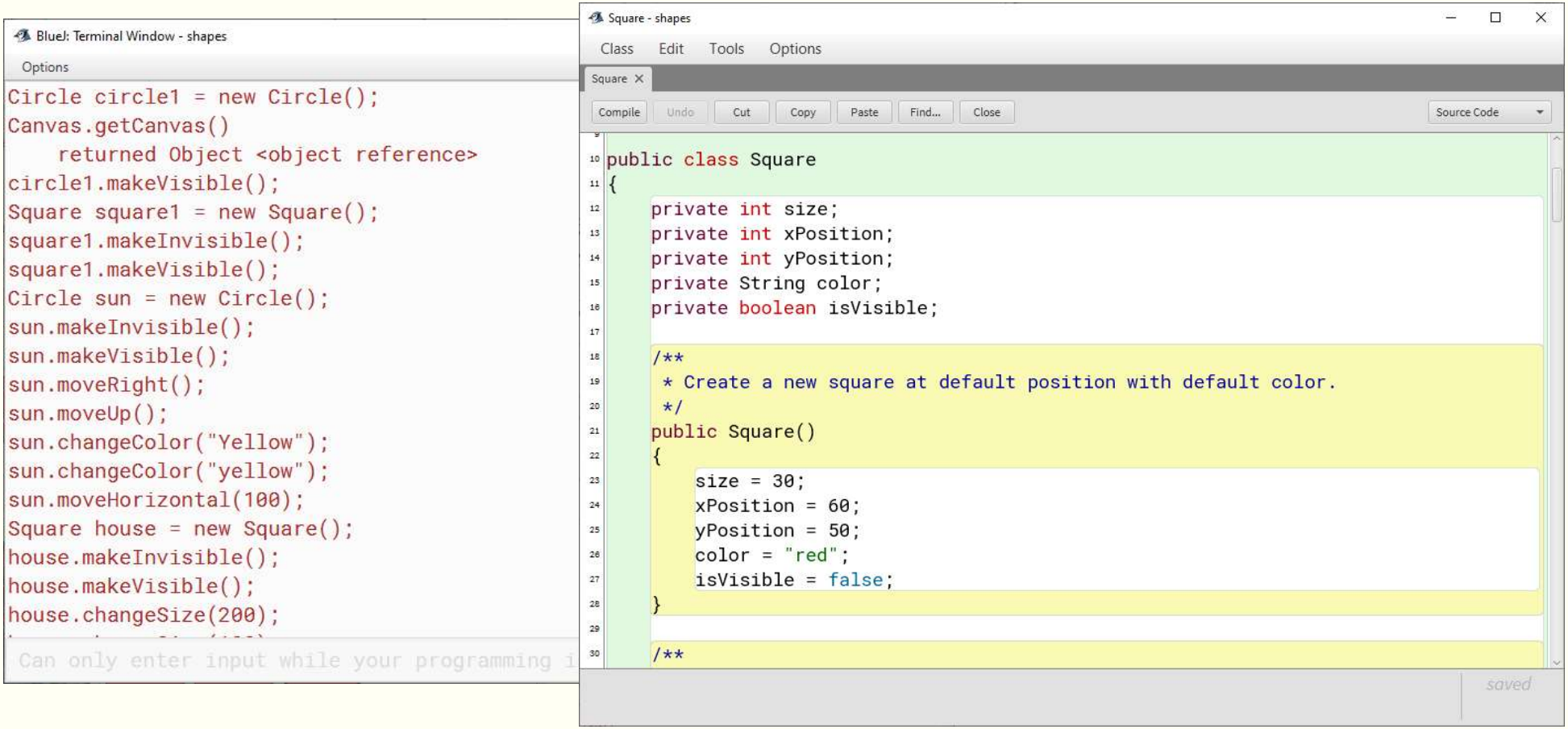


Practice – BlueJ Objects Part 3

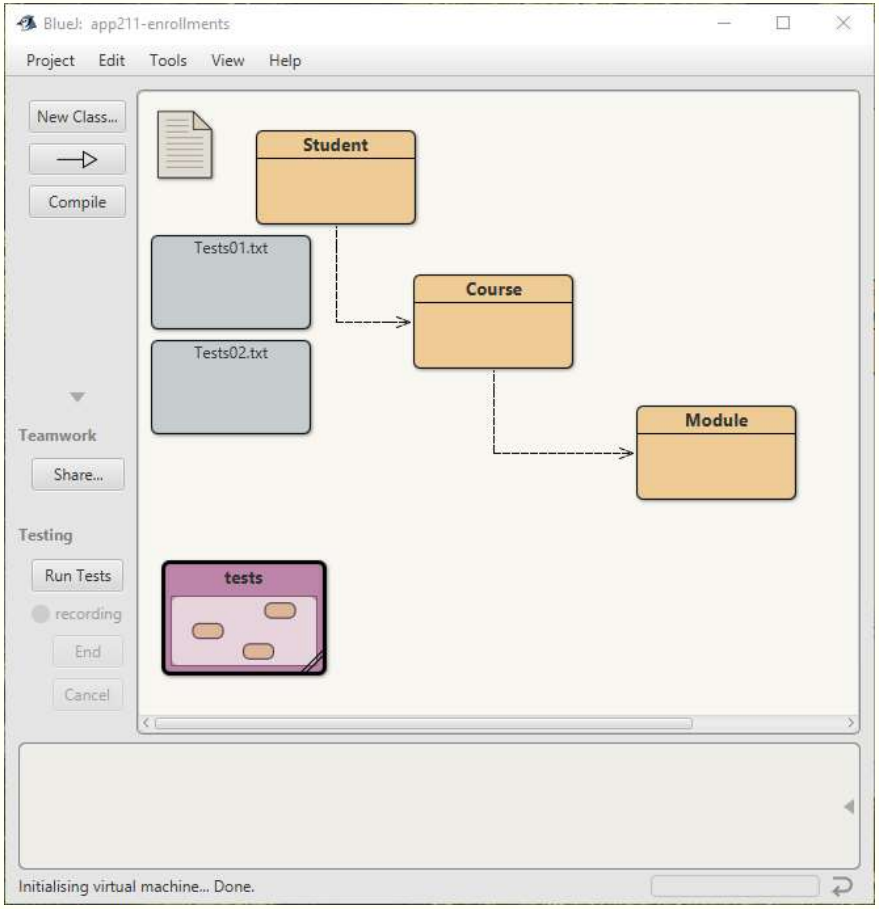
- Only colors are yellow, green, blue, black, magenta and red.
- Select **Show Terminal** from the view menu.
- Make sure Show Method Calls option is set to on.
- What you will see is the Java code needed to call the methods.
- Double click on the Square class an look at the Java code.



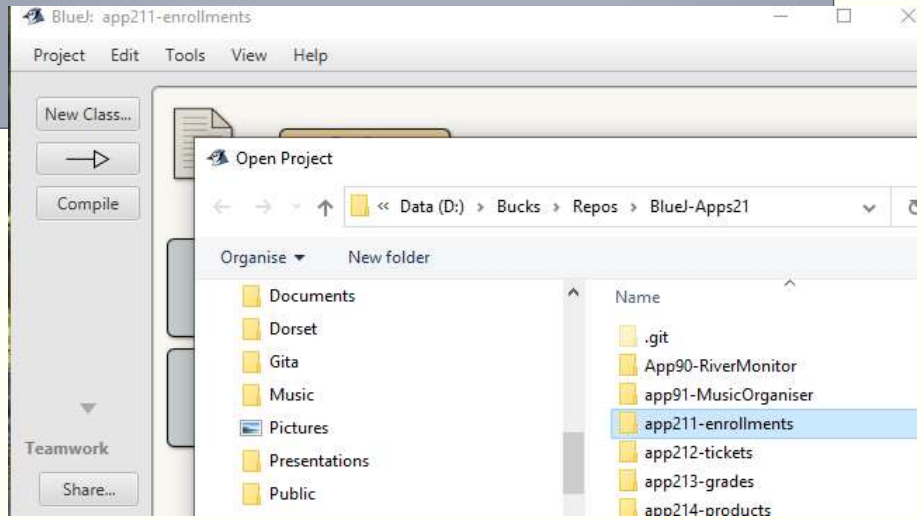
Java Code


BlueJ: Terminal Window - shapes
Options
Circle circle1 = new Circle();
Canvas.getCanvas()
returned Object <object reference>
circle1.makeVisible();
Square square1 = new Square();
square1.makeInvisible();
square1.makeVisible();
Circle sun = new Circle();
sun.makeInvisible();
sun.makeVisible();
sun.moveRight();
sun.moveUp();
sun.changeColor("Yellow");
sun.changeColor("yellow");
sun.moveHorizontal(100);
Square house = new Square();
house.makeInvisible();
house.makeVisible();
house.changeSize(200);
Can only enter input while your programming i
Square - shapes
Class
Edit
Tools
Options
Square
Compile
Undo
Cut
Copy
Paste
Find...
Close
Source Code
public class Square
{
private int size;
private int xPosition;
private int yPosition;
private String color;
private boolean isVisible;
/**
* Create a new square at default position with default color.
*/
public Square()
{
size = 30;
xPosition = 60;
yPosition = 50;
color = "red";
isVisible = false;
}
/**
saved

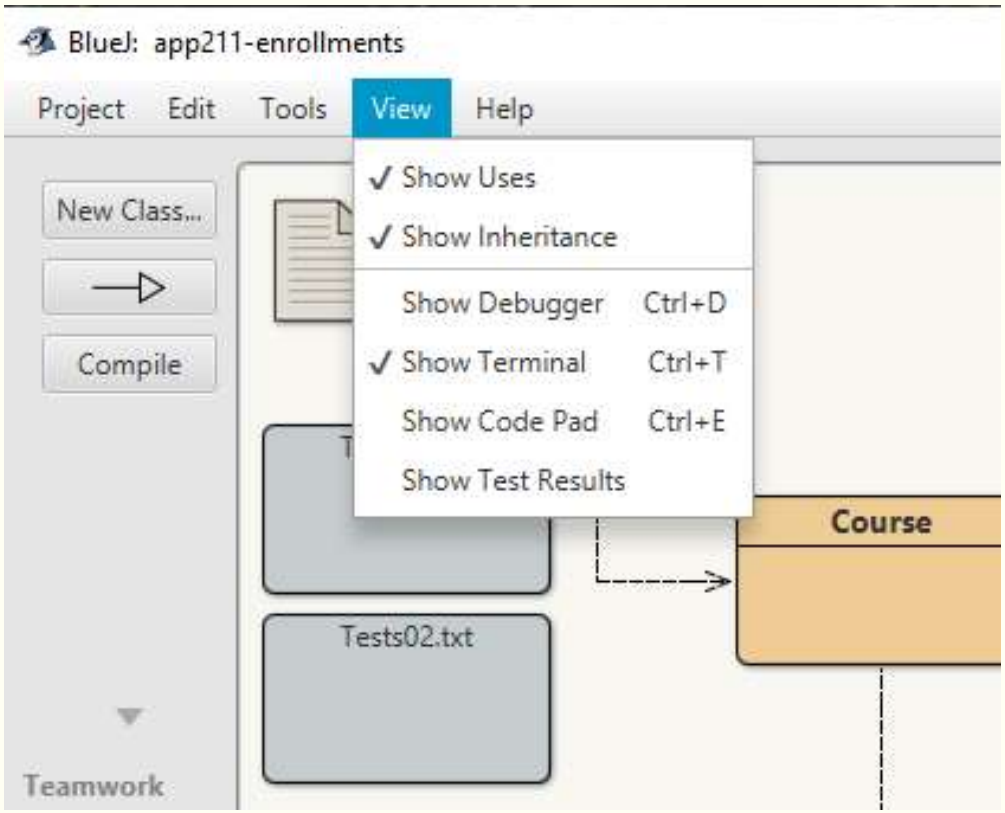
Open the app21-01-enrollments Project



- Open BlueJ
- Open Project and find the app211-enrollments project folder
- Look at assessment details https://github.com/BNU-CO452/BlueJ-Apps/wiki/App-211



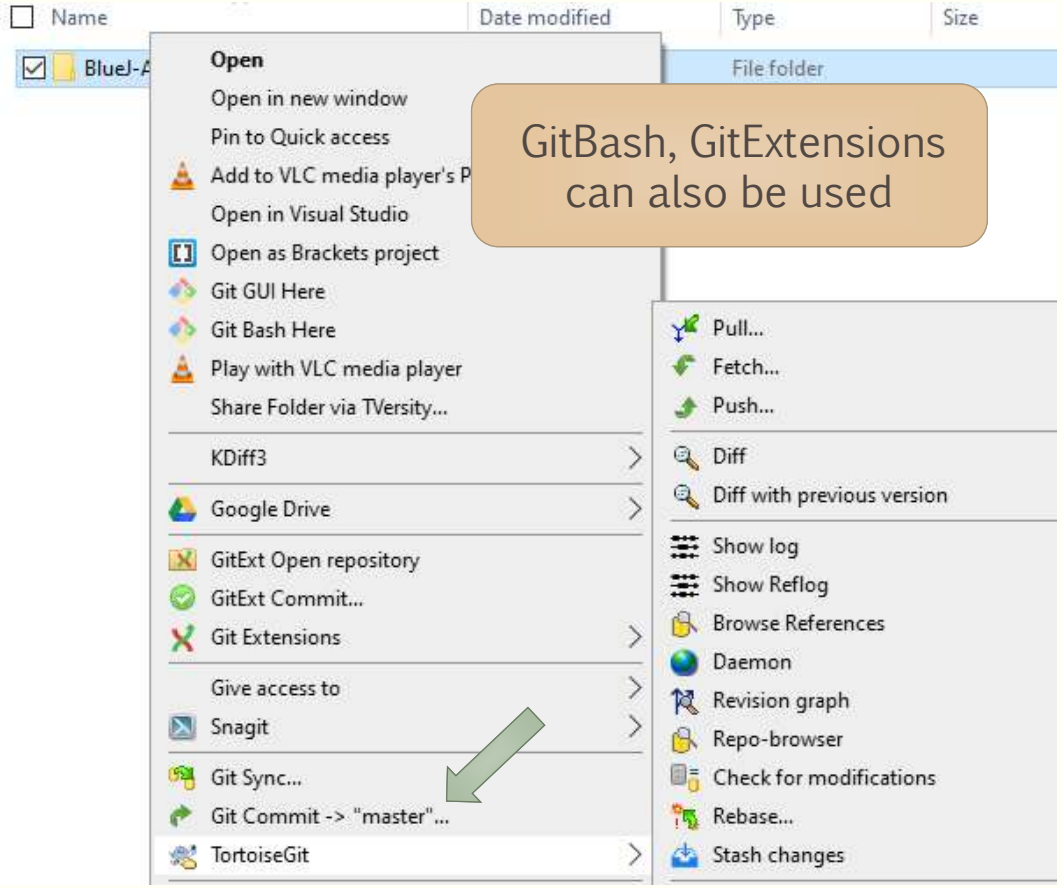
How to document Required Testing (wiki App21-01-Enrolments)



- Make sure that the terminal view is selected
- Create a student object "**gita**"
- Create a course object "**computing**"
- Enrol a student on the course
- In the terminal window save the file as Tests01.txt to the app211-enrollments folder
- Commit & Push the changes

Tortoise Git -> Making Changes

See wiki on Git



Edit the **Student** class and update the class comment and add your name as modified by

Save the changes and **compile**

Right click on the repository folder and **commit** the changes (can be done four ways)

Push up the changes up to the remote repository

At home for first time **clone** you remote repository

Next time **pull** down the changes when you start work using GitHub Desktop.