IT Software Development Project

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2019

Course Details

Project Structure

- The aim of this course is to develop a piece of (reasonably) complex software based on a set of pre-defined requirements
  - This will build on what you have learned in Programming, Database Theory and Applications and Software Project Management.
  - It may also introduce you to some new technologies

- Launch session: **Now**
- Lab sessions: **Weekly** – I will be present to answer questions and take attendance
  - Wednesday 9 Jan = 12 noon to 1pm : Boyd Orr Lab 1028
  - Wednesday 16 Jan = 11am to 1pm : Boyd Orr Lab 1028
  - Wednesday 23 Jan = 11am to 1pm : Boyd Orr Lab 1028
  - Wednesday 30 Jan = 11am to 1pm : Boyd Orr Lab 1028
  - Wednesday 6 Feb = 11am to 1pm : Boyd Orr Lab 1028

Teams

- This is a **team-based** development effort
- Teams should be comprised of **5 students**
  - No larger than this!
  - A few teams may only comprise 4 students if the numbers don’t add up

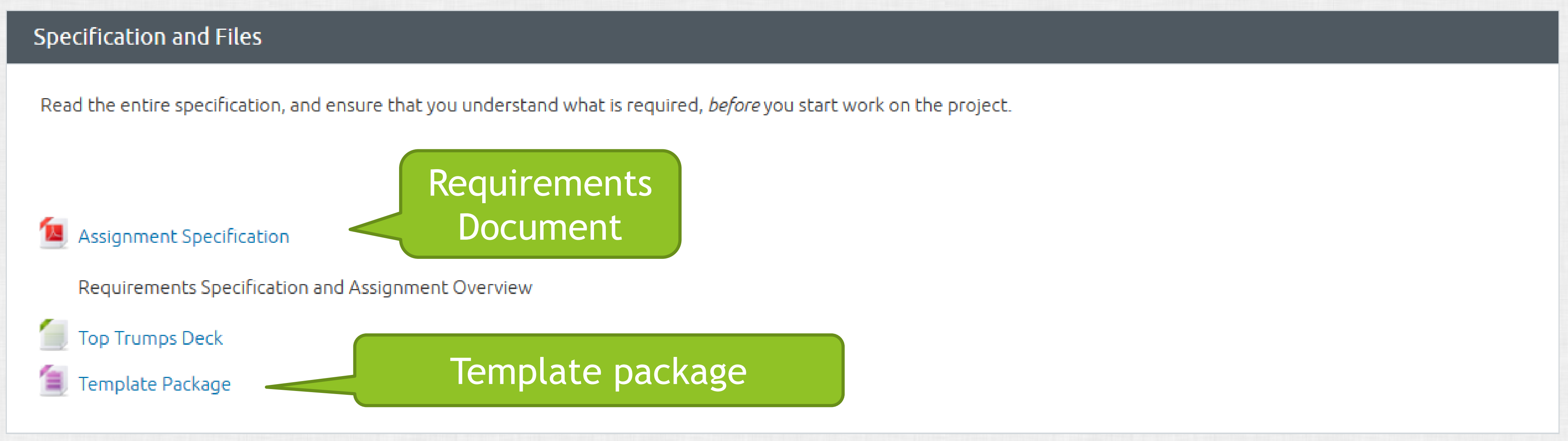
- Teams should be **self-organised**
  - Go out and create your own teams – today!
  - If you can’t find a team I will allocate you to one (end of Thursday)

Course Details

- This course takes place over the **next 5 weeks**!
  - Submission is **Monday February 11th**
- You are **given**:
  - A detailed **requirements document** that specifies what you are to build
  - A **software template package** written in Java to get you started
- You **submit** (and are assessed on):
  - A **Team Report** detailing your software design, implementation, testing and functionality
  - A **Personal Report**, detailing what you contributed (in contrast to the rest of your team)
  - The **Code** for your project
  - **Peer evaluation form**

Read the instructions carefully: Recall that failure to comply with instructions in the specification will result in a 2 band penalty as per School policy

Moodle



Specification and Files

Read the entire specification, and ensure that you understand what is required, *before* you start work on the project.

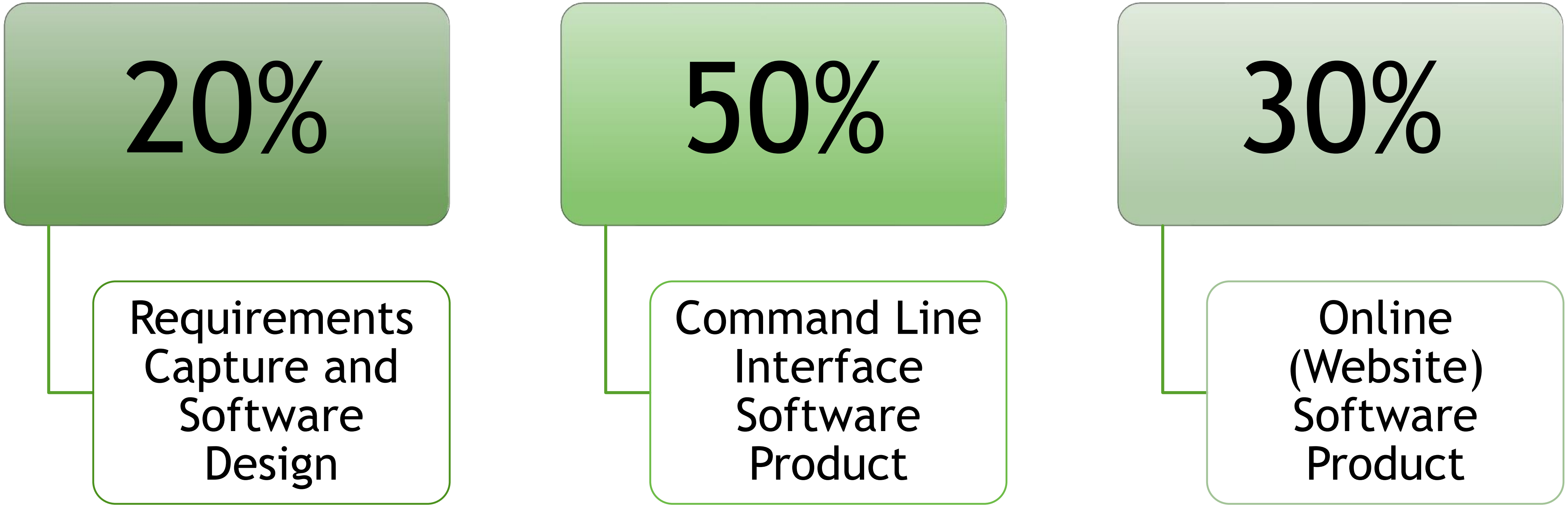
Assignment Specification

Requirements Specification and Assignment Overview

Top Trumps Deck

Template Package

Assessment Breakdown



20%

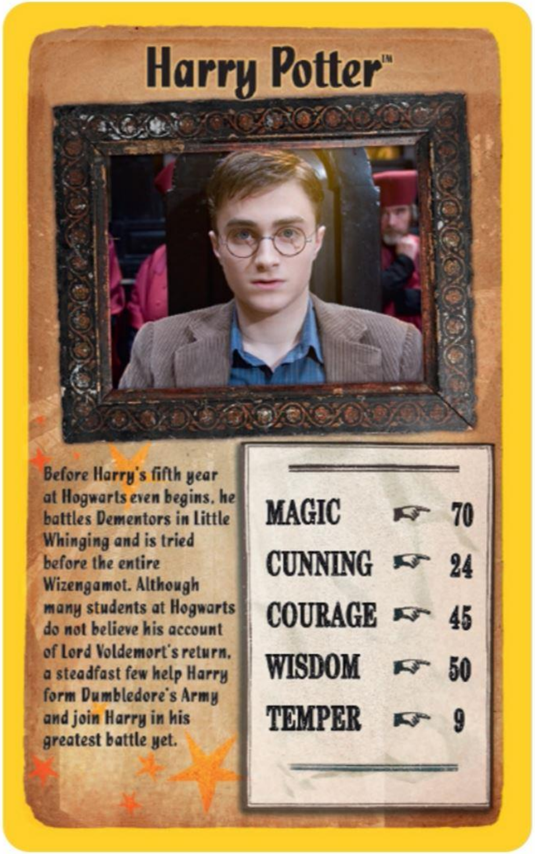
Requirements Capture and Software Design

50%

Command Line Interface Software Product

30%

Online (Website) Software Product



Harry Potter™

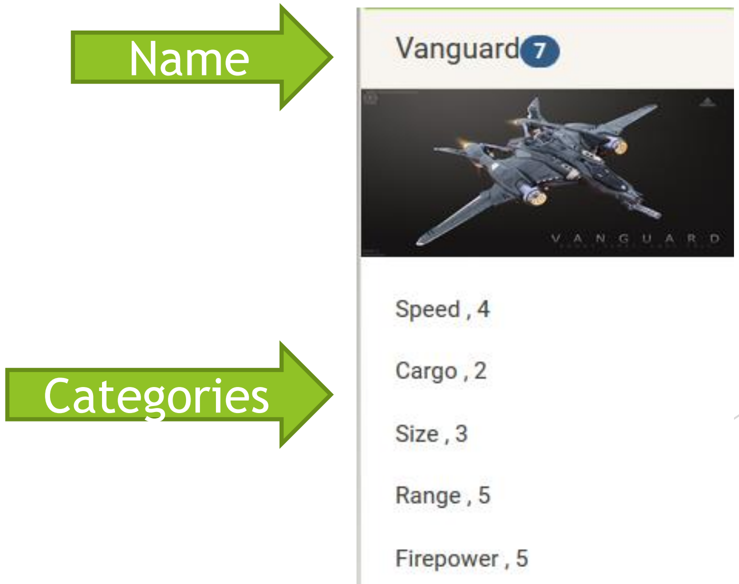
Before Harry's fifth year at Hogwarts even begins, he battles Dementors in Little Whinging and is tried before the entire Wizengamot. Although many students at Hogwarts do not believe his account of Lord Voldemort's return, a steadfast few help Harry form Dumbledore's Army and join Harry in his greatest battle yet.

MAGIC	☞	70
CUNNING	☞	24
COURAGE	☞	45
WISDOM	☞	50
TEMPER	☞	9

Exercise (Top Trumps)

What are you building?

- **Implement a simplified computer version of the game ‘Top Trumps’**
  - Deck of cards based around a topic, split amongst the players
  - Each card has numerical values for categories
  - In each round, players draw a card from their deck and compare numerical values for a selected category
  - The winner gets all of the cards
  - If you have no cards left you lose
  - Goal is to be the last player with cards



Name

Categories

Vanguard 7

Speed , 4

Cargo , 2

Size , 3

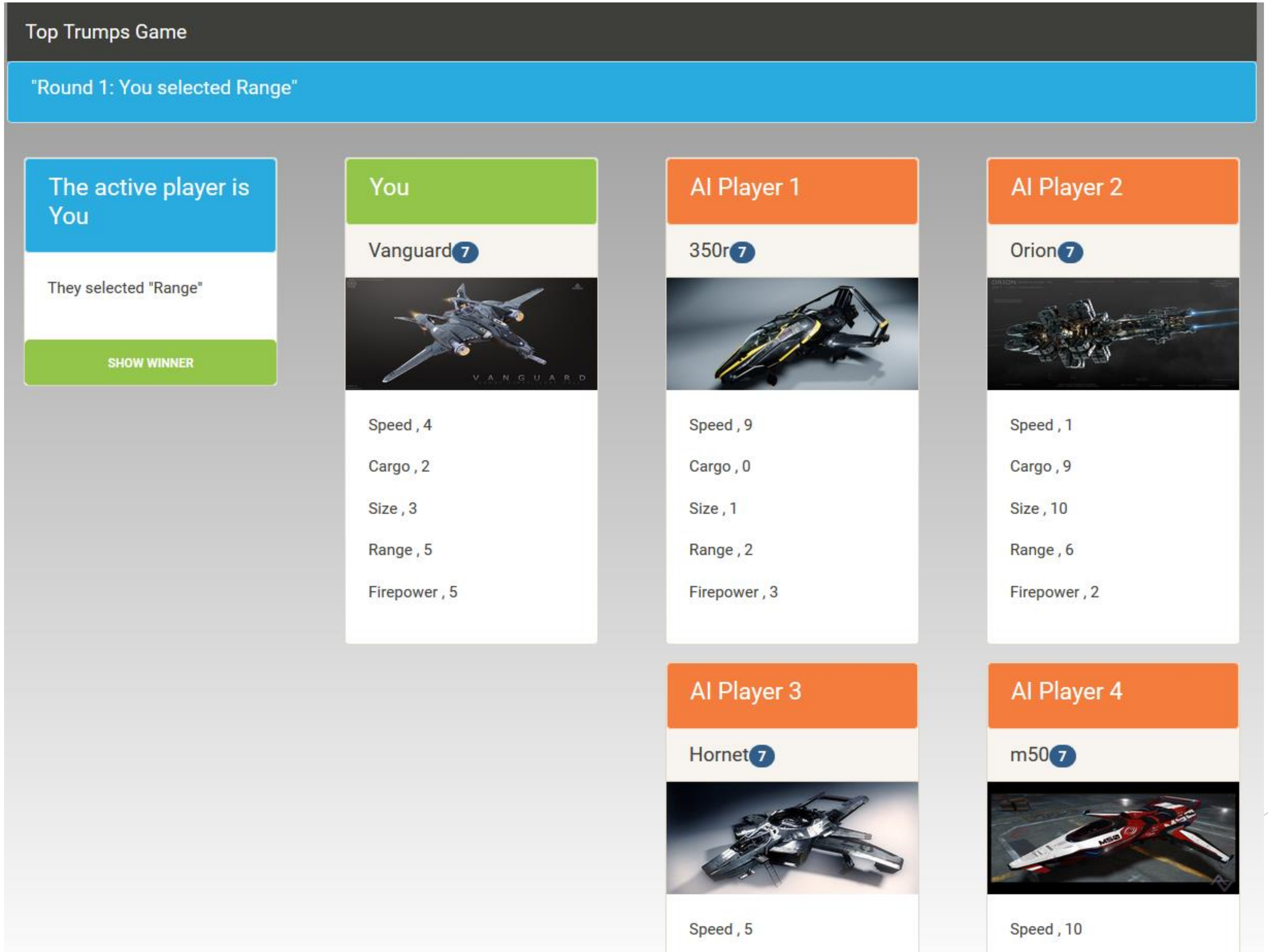
Range , 5

Firepower , 5

Deck

- You may use any top trumps theme you want
  - An example deck based on science fiction spaceships is included in the software template
- You can create your own deck of cards if you wish
  - (you don’t get more marks for this though)

Example Demo



Top Trumps Game

"Round 1: You selected Range"

The active player is You

They selected "Range"

You

Vanguard 7

Speed , 4

Cargo , 2

Size , 3

Range , 5

Firepower , 5

AI Player 1

350r 7

Speed , 9

Cargo , 0

Size , 1

Range , 2

Firepower , 3

AI Player 2

Orion 7

Speed , 1

Cargo , 9

Size , 10

Range , 6

Firepower , 2

AI Player 3

Hornet 7

Speed , 5

AI Player 4

m50 7

Speed , 10

Getting Started

First Step

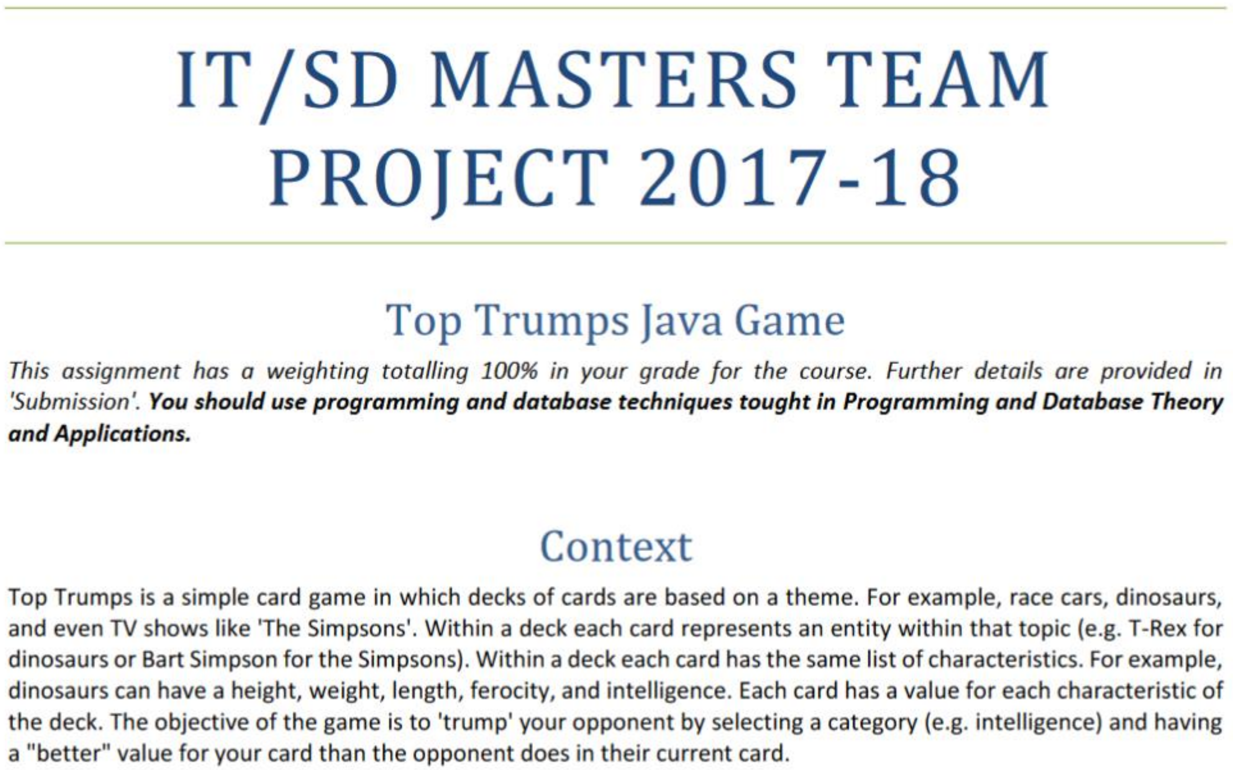
- Find 4 other people to form your team
  - Use the time after this launch session!
  - Try and have your team organised by the end of today

- Add your team to the online team spreadsheet
  - https://docs.google.com/spreadsheets/d/1jIPmkAWz4ohmfX0deRt5CgSTuFOMBrX3ied5g8zQkpY/edit?usp=sharing
  - One row per team

- If you are not in a team by Friday morning I will allocate you to a random team that does not have yet have five people in it
  - If for some reason you do not have a team by the end of Friday then email me immediately!

Second Step

- Read the Instructions and Requirements Carefully!



IT/SD MASTERS TEAM PROJECT 2017-18

Top Trumps Java Game

This assignment has a weighting totalling 100% in your grade for the course. Further details are provided in 'Submission'. ***You should use programming and database techniques tought in Programming and Database Theory and Applications.***

Context

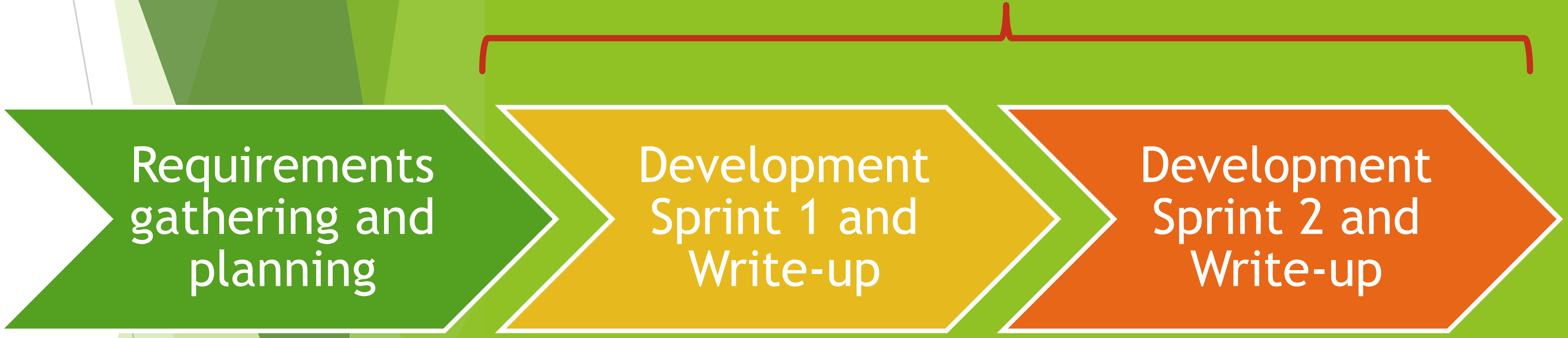
Top Trumps is a simple card game in which decks of cards are based on a theme. For example, race cars, dinosaurs, and even TV shows like 'The Simpsons'. Within a deck each card represents an entity within that topic (e.g. T-Rex for dinosaurs or Bart Simpson for the Simpsons). Within a deck each card has the same list of characteristics. For example, dinosaurs can have a height, weight, length, ferocity, and intelligence. Each card has a value for each characteristic of the deck. The objective of the game is to 'trump' your opponent by selecting a category (e.g. intelligence) and having a "better" value for your card than the opponent does in their current card.

Third Step

- Decide on your team organisation
  - Fill in and submit organisation document (**required**)
  - **Due Monday (14/01/2018)**
- This should contain:
  - **Roles and responsibilities**: who does what?
  - **Authority**: Who decides? How are decisions made?
  - **Communication**: Where and when will you meet? What must be communicated? When and how often? By whom? By what means?
  - **Information Management**: Where is info kept? How and when will it be distributed?
  - **Tools**: What technology will you use and how will you use it?

Suggested Timeline

You are **required** to have
two ***Scrum*** development sprints



Requirements gathering and planning

Week 1-2

Development Sprint 1 and Write-up

Week 2-3

Development Sprint 2 and Write-up

Week 3-4

Save Week 5 for time over-runs and finishing the written deliverables

Design

- Identify the user stories
- Identify which ones you'll do in each sprint
    - Command line vs. online modes
- Design your classes
    - what objects do you need?
    - what are the responsibilities of each object?
    - how will they interact?
- Think about the GUI - draw it!
    - Then think about what the interactions are between the browser and the backend are needed to make it work

Development and Write-up

- Make sure everyone in the team can compile and run the **template package!**
- Decide on how code will be contributed by different members
- Have other team members test your code

- Write group report together and individual separately
- Don’t leave write-up until the end
  - You can start writing the design sections of the report as soon as you are done with the initial planning!

Considerations

Team Working

Be self organising – you own this project

Structure your project based on the time available

Plan ahead

Use good software engineering practices

Agree responsibilities and roles early! (today)

What skill sets does your team have – do you need to have people learn new skills?

Who is going to produce what and when is it due

Meet frequently and be strict!

Run stand up sessions

What each person has done, what they're working on, any problems

Aim to meet at least twice a week preferably in the same place and at the same time

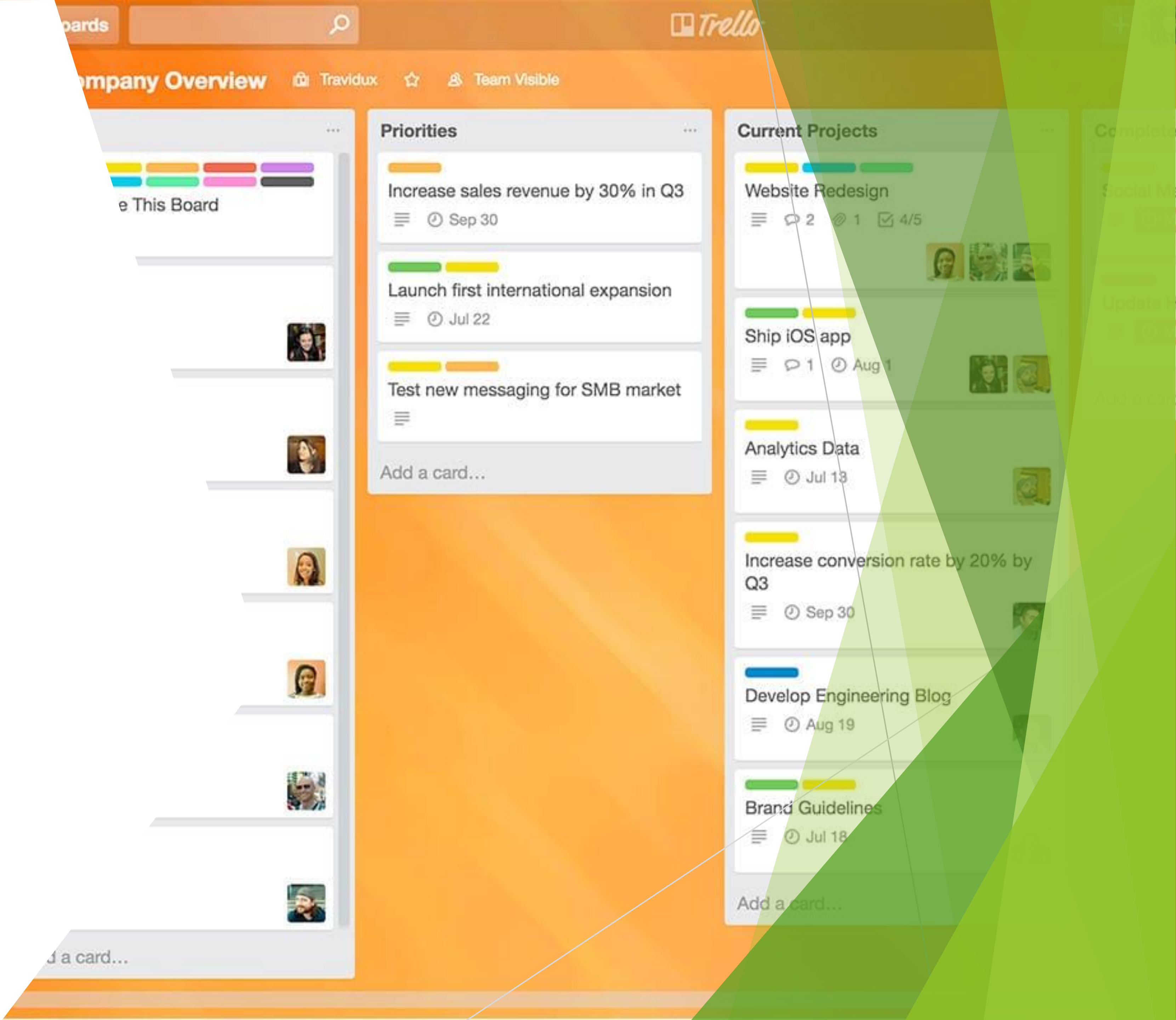
Identify Problems Early

Communication is key

Where are there dependencies between components?

Tracking Progress

- It is important to use modern tools to track development progress
- **Trello** is a free tool that can help you list out action points and assign them to people



oards

Trello

ompany Overview Travidux Team Visible

e This Board

a card...

Priorities

Increase sales revenue by 30% in Q3
Sep 30

Launch first international expansion
Jul 22

Test new messaging for SMB market

Add a card...

Current Projects

Website Redesign
2 1 4/5

Ship iOS app
1 Aug 1

Analytics Data
Jul 13

Increase conversion rate by 20% by Q3
Sep 30

Develop Engineering Blog
Aug 19

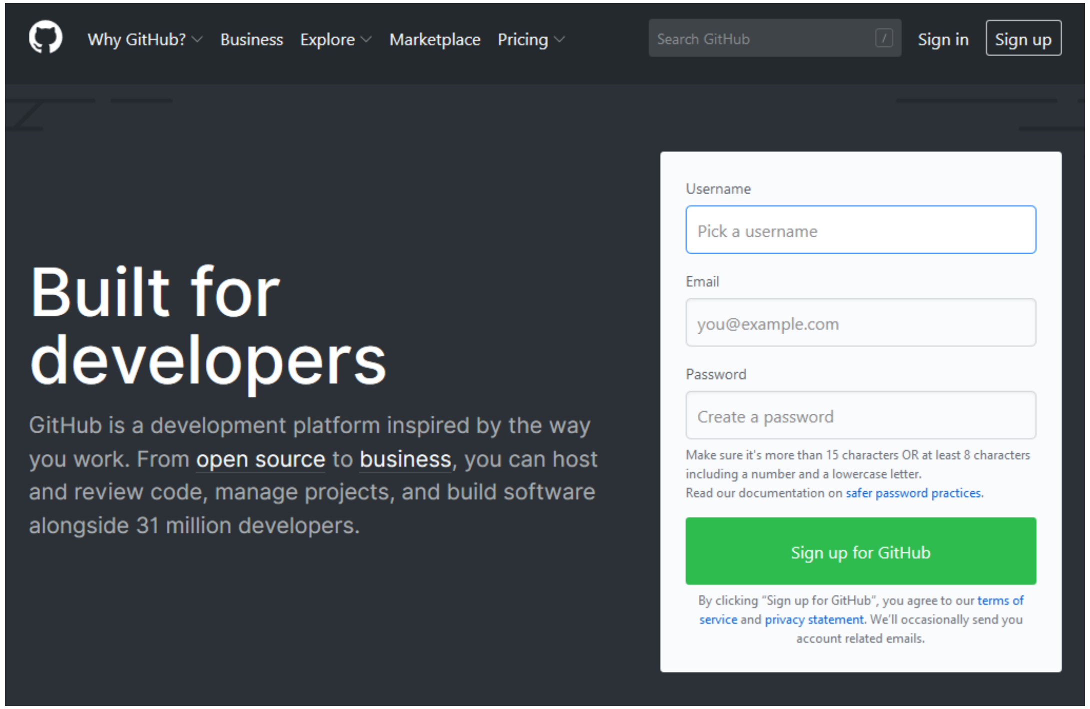
Brand Guidelines
Jul 18

Add a card...

Complete

Manage your software

- When developing software, particularly as part of a team, it is critical that you maintain a central repository for your code that you all contribute to
- **Github** has become the defacto-standard for this
- It also provides a commit paper trail in case you need to defend your work later



Built for developers

GitHub is a development platform inspired by the way you work. From open source to business, you can host and review code, manage projects, and build software alongside 31 million developers.

Username: Pick a username

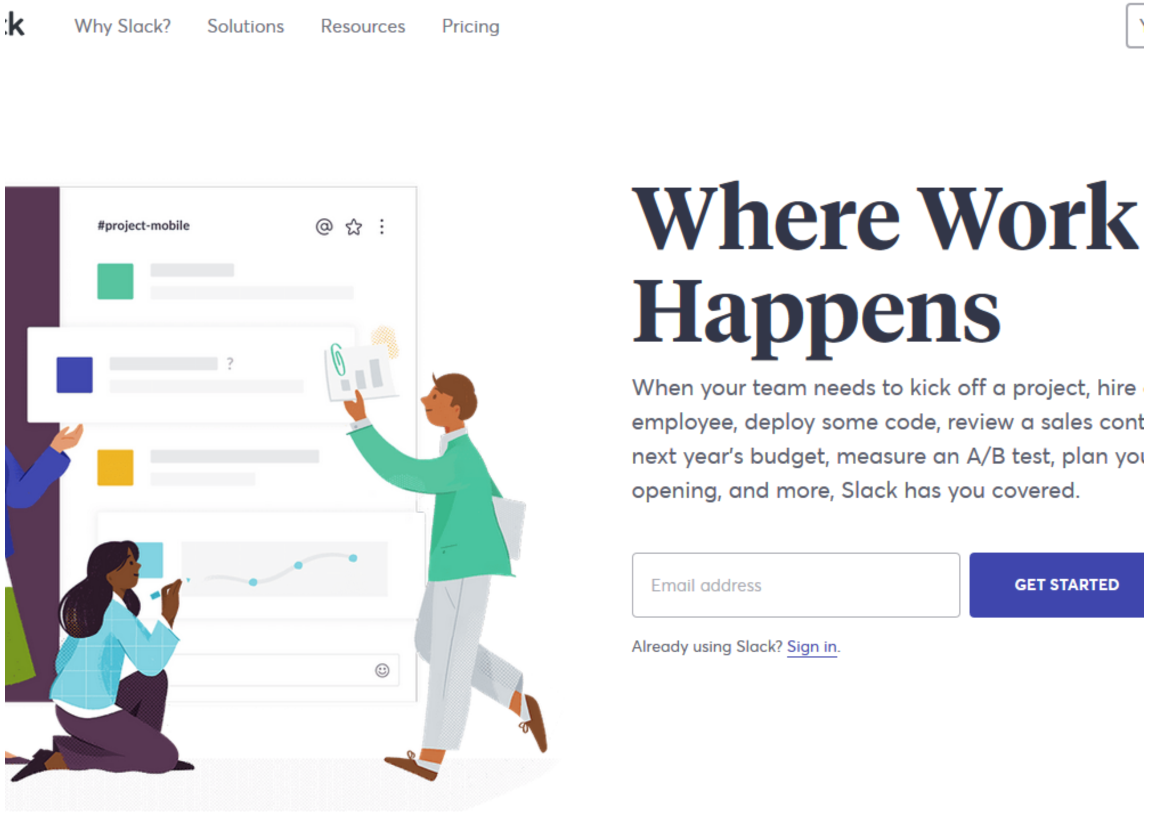
Email: you@example.com

Password: Create a password

Make sure it's more than 15 characters OR at least 8 characters including a number and a lowercase letter.
Read our documentation on safer password practices.

By clicking "Sign up for GitHub", you agree to our terms of service and privacy statement. We'll occasionally send you account related emails.

Communicate



Where Work Happens

When your team needs to kick off a project, hire
employee, deploy some code, review a sales cont
next year's budget, measure an A/B test, plan yo
opening, and more, Slack has you covered.

Already using Slack? Sign in.

- A good way to make your team more productive is to maintain a live chat channel where you can discuss issues and ask questions, as well as share files
- I recommend **Slack** for this, if you want a Slack channel for your group email me and ill send you a join link

Individual Contributions

- The team grade will be adjusted for each individual on the basis of their contribution to the project.
  - Via peer evaluation forms
  - Also monitored by the course co-ordinator (me)

- If things are not going as planned then let me know, you can also request an individual appointment
  - **Email: richard.mccreadie@glasgow.ac.uk**

Plagiarism

- Read the University guidelines:
  - https://www.gla.ac.uk/myglasgow/leads/students/plagiarism/
- For this project you are allowed to discuss challenges or issues with members from other teams
- You may not use code or text from other teams
- We do check for this – so don’t do it!
  - If you are using tools recommended above then your will have a paper trail to show that your work is your own

Questions?

Template Package

Template Package

- The requirements for the project involve the construction of two versions of the top trumps game
  - A command line interface (CLI) version
  - An online (website) version

- The course assumes that you are familiar with programming in Java.
  - However, some of you may not have developed web services up to this point, which involves understanding basic **Web APIs**, along with some coding in **HTML** and **Javascript**

Template Package

- To get you started, we provide a **template package**, which provides
  - **Maven** configuration, enabling automatic importing of libraries for creating web services
  - **Basic reading of command line flags** allowing the user to select CLI or Online mode
  - A **Web service** that can be run out-of-the box with **examples**
- We expect students to extend the template package to create their product

Maven

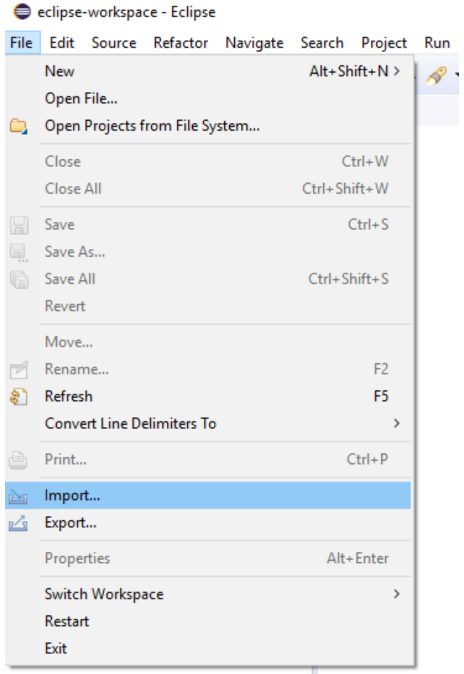
- The Template Package uses the **Maven** software project management and comprehension tool to import other libraries it needs to run
  - E.g. Libraries for hosting the web service

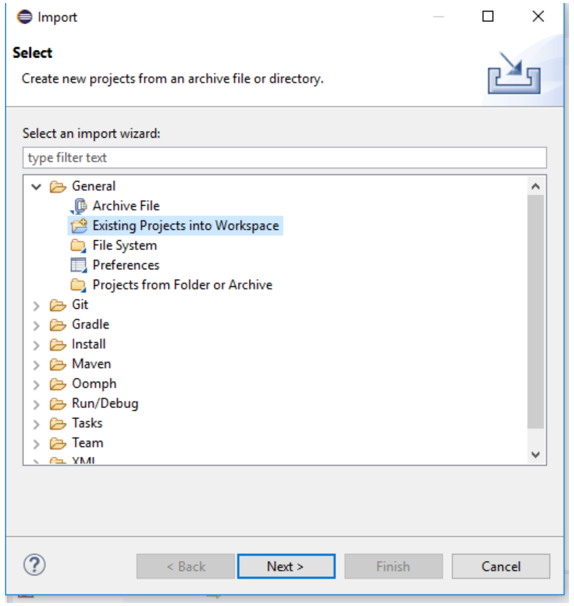
- The **pom.xml** file in the Template Package tells Maven what it should import

- You will either need to have **Maven installed** on the **machine your are working on** or be using an **IDE that supports Maven natively**, e.g. modern versions of Eclipse

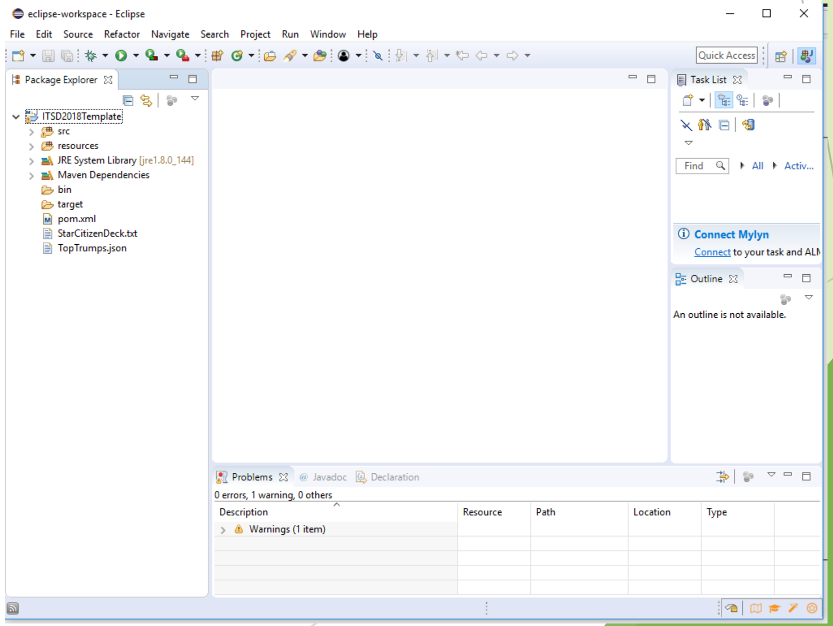
Compiling the Template Package (Via Eclipse)

- You can also compile the project within the Eclipse IDE (https://www.eclipse.org/downloads/)
- The Template Package is formatted as an **Eclipse project** and so should be importable directly – Eclipse will then compile any changes automatically





Create new projects from an archive file or directory.



Connect to your task and ALM

An outline is not available.

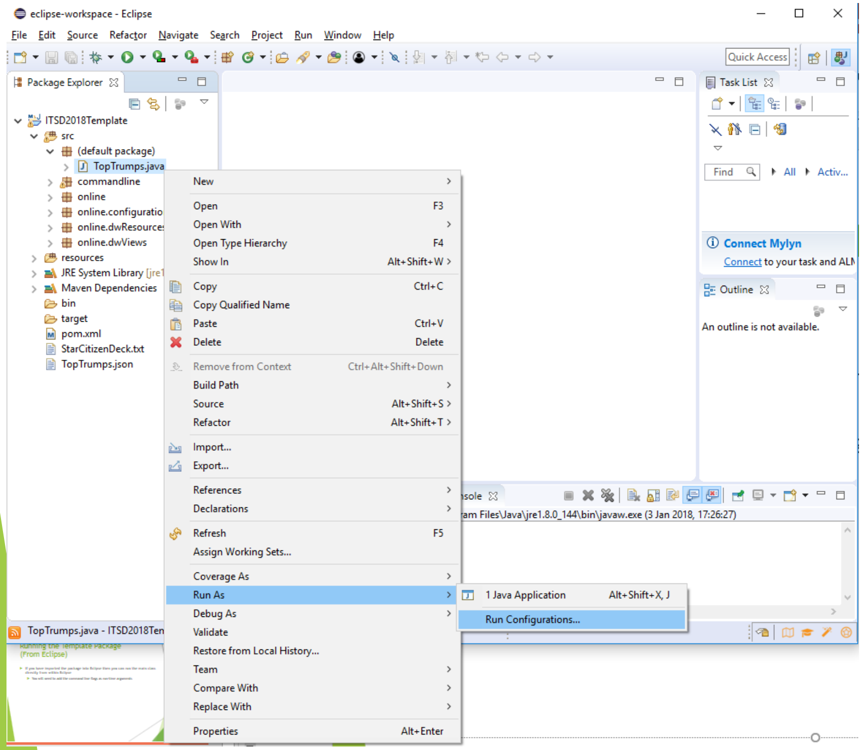
0 errors, 1 warning, 0 others

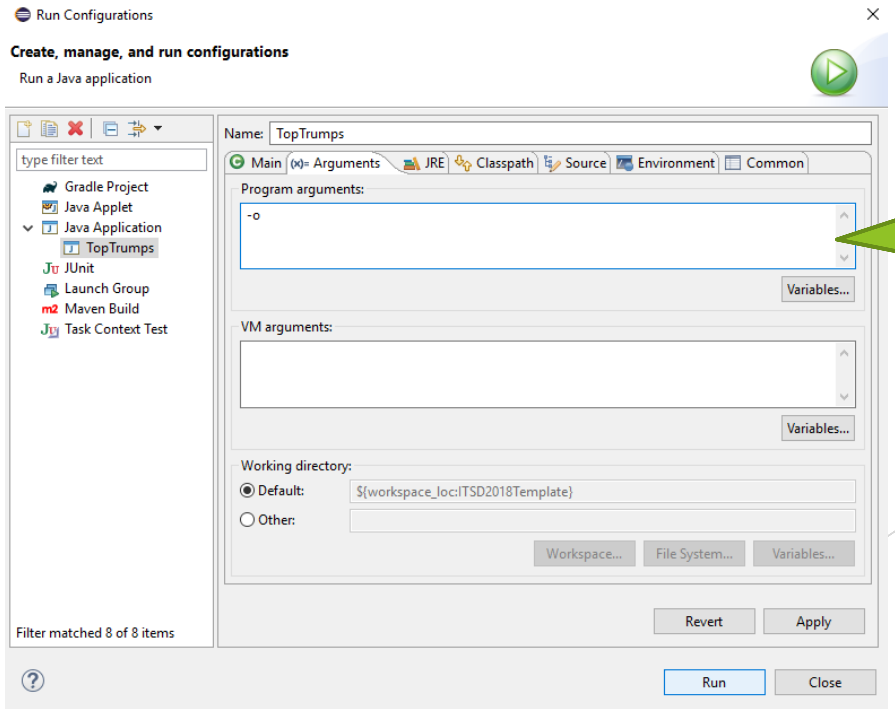
Compiling the Template Package (Maven installed on the local machine)

- If you have Maven installed on the local machine then you can compile the Template Package via the command line
- From a terminal in the located in the root directory of the Template Package issue the following command:
  - mvn clean package
- This will trigger the downloading of software dependencies, compilation of the classes in the source directory, and the packaging of both into a runnable Jar file.
- The output jar is stored in the ‘target’ directory
  - target/ITSD2018Project-1.0.jar

Running the Template Package (From Eclipse)

- If you have imported the package into Eclipse then you can run the main class directly from within Eclipse
  - You will need to add the command line flags as program arguments





Name: TopTrumps

Program arguments:

```
-o
```

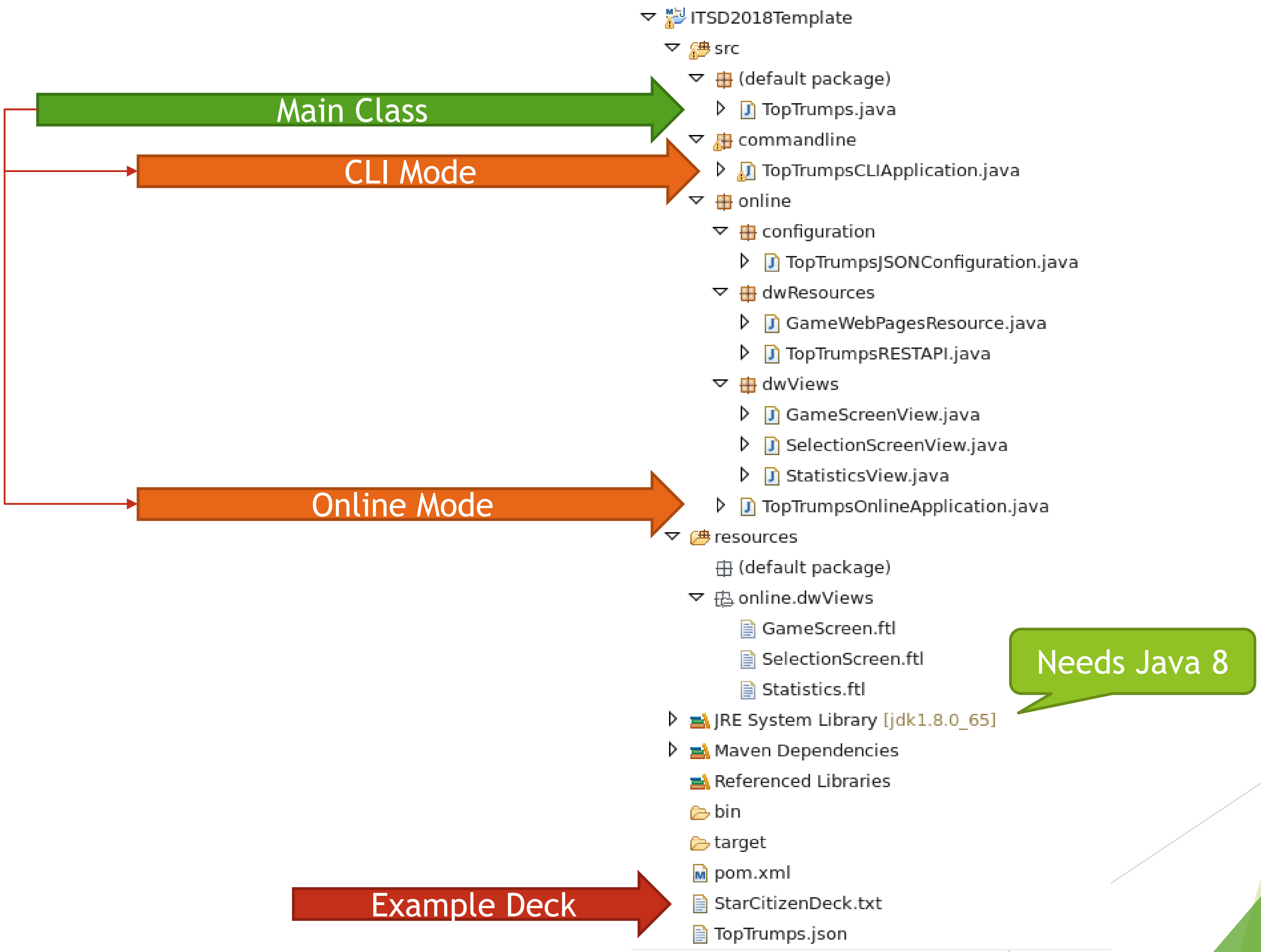
Working directory:
● Default: ${workspace_loc:ITSD2018Template}
○ Other:

e.g. -o for Online Mode

Running the Template Package (From Jar)

- If you have compiled the project using the Maven command line package command, then you can simply run the resultant Jar file
  - java –jar target/ITSD2018Project-1.0.jar <switches>

- [CLI Mode]
  - java –jar target/ITSD2018Project-1.0.jar –c
- [CLI Mode + Log to File]
  - java –jar target/ITSD2018Project-1.0.jar –c -t
- [Online Mode]
  - java –jar target/ITSD2018Project-1.0.jar -o



```
ITSD2018Template
  src
    (default package)
      TopTrumps.java
    commandline
      TopTrumpsCLIApplication.java
    online
      configuration
        TopTrumpsJSONConfiguration.java
      dwResources
        GameWebPagesResource.java
        TopTrumpsRESTAPI.java
      dwViews
        GameScreenView.java
        SelectionScreenView.java
        StatisticsView.java
      TopTrumpsOnlineApplication.java
  resources
    (default package)
    online.dwViews
      GameScreen.ftl
      SelectionScreen.ftl
      Statistics.ftl
  JRE System Library [jdk1.8.0_65]
  Maven Dependencies
  Referenced Libraries
  bin
  target
  pom.xml
  StarCitizenDeck.txt
  TopTrumps.json
```

Main Class

CLI Mode

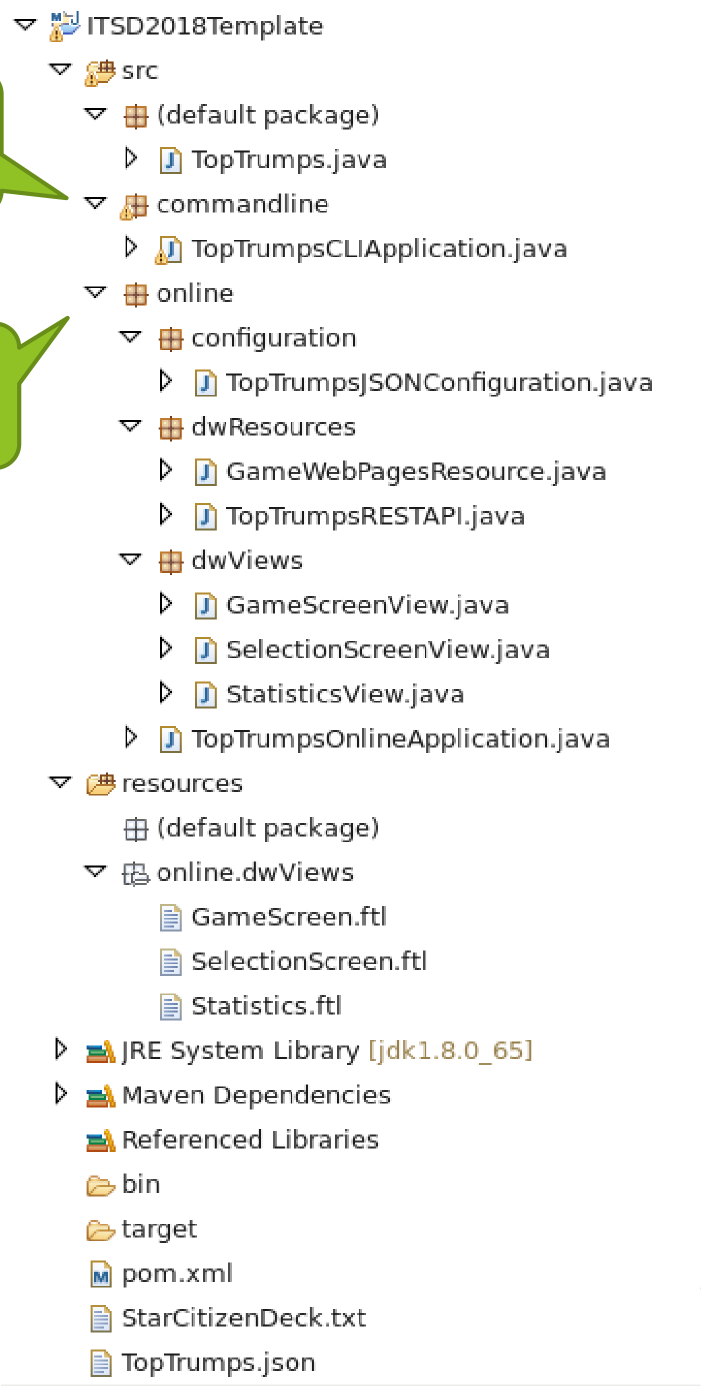
Online Mode

Needs Java 8

Example Deck

Add CLI objects and logic to the ‘commandline’ package

Add classes and logic for the online mode to the ‘online’ package



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        TopTrumpsRESTAPI.java
      dwViews
        GameScreenView.java
        SelectionScreenView.java
        StatisticsView.java
      TopTrumpsOnlineApplication.java
  resources
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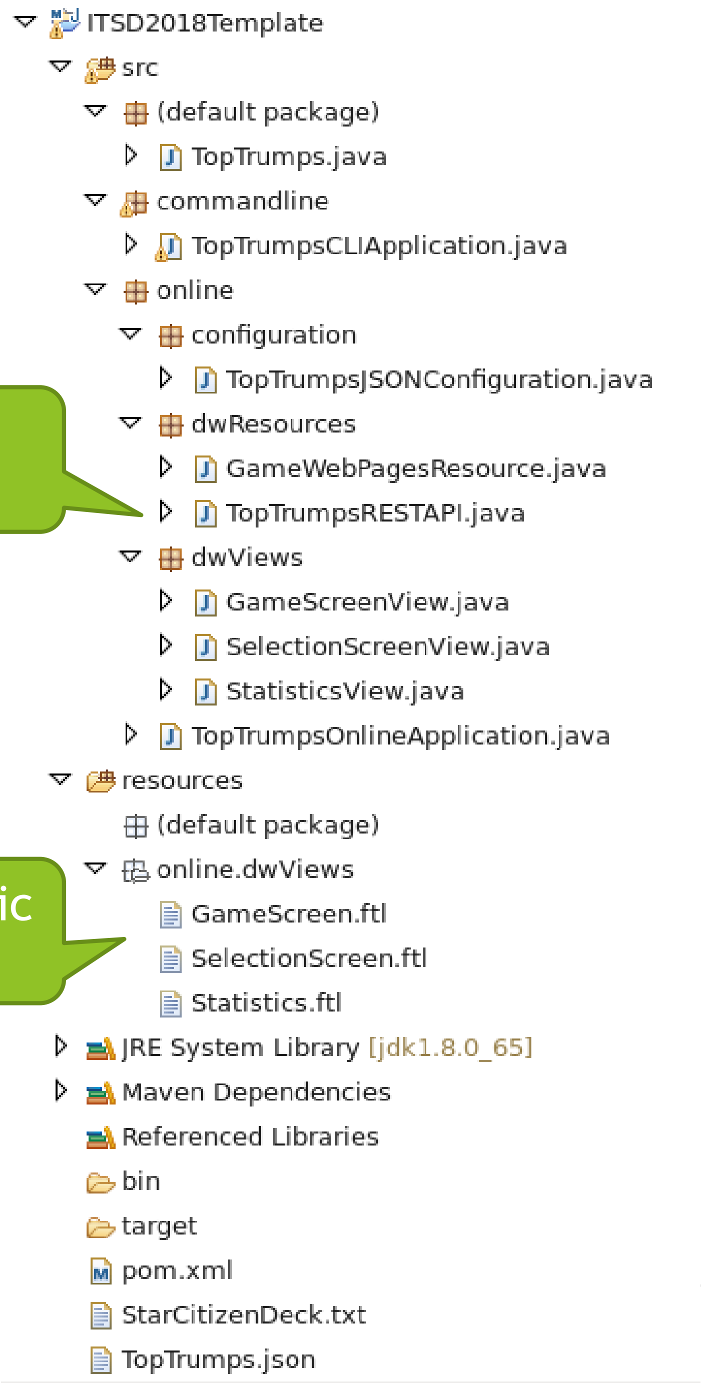
  target
  pom.xml
  StarCitizenDeck.txt
  TopTrumps.json
```

Online Mode Skeleton Code

The back-end API service methods/logic need to be added to this class

Your Website HTML and Javascript logic needs to be added to these files



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        GameScreenView.java
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  Referenced Libraries
  bin
  target
  pom.xml
  StarCitizenDeck.txt
  TopTrumps.json
```

Next Step

Now…

- Form your team
- Add your team to the **Online Team Spreadsheet** (Due: **End of Tomorrow**)
  - https://docs.google.com/spreadsheets/d/1jIPmkAWz4ohmfX0deRt5CgSTuFOMBrX3ied5g8zQkpY/edit#gid=0
  - Download the project requirements document/instructions from Moodle
  - Read it carefully… multiple times
- Fill in and submit your **Team Organisation Document** (Due: **End of Monday**)
- Download the Template Package from Moodle and compile/test it
- Start your software design

Labs: 11am to 1pm : Boyd Orr Lab 1028