Dr Michael Scott

"The first 90 percent of the code accounts for the first 90 percent of the development time.

"The remaining 10 percent of the code accounts for the other 90 percent of the development time."

— Tom Cargill

"Hofstadter's Law:

"It always takes longer than you expect, even when you take into account Hofstadter's Law."

— Douglas Hofstadter

This flavour picture needs a caption...

Introduction

In this assignment, you will design and implement a 2D game for Windows PC. Your game will be written in Python using the PyGame library. You will work in small groups (typically, 3–4 students).

Computing for Games encompasses a broad range of technical, creative, communicative, and commercial skills. All of your assignments involve a mixture of these; but, this assignment emphasises a rich combination that reflects industry practice.

This assignment is formed of several parts:

(A) **Write**, as an **individual**, a 2-page handout that will:

    i. **outline** a game concept;
    ii. **state** a target market;
    iii. **describe** at least **one** core game mechanic;
    iv. and then **explain how** the game concept relates to the constraints.

(B) **Present**, as an **individual**, a 3-minute 'elevator pitch', which will:

    i. **clarify** the game concept contained in your handout;
    ii. and **illustrate why** someone should invest in your game concept.

(C) **Prepare**, as a **group**, a plan, which will:

    i. **identify** the skills and time available to complete pre-production;
    ii. **iterate** upon **and improve** the game design;
    iii. **describe** the key user stories that comprise the game design;
    iv. and **highlight** the stories that will comprise a minimal viable product.

(D) **Implement**, as a **group**, an initial pre-production prototype of the game in PyGame which will:

    i. **illustrate** the core game mechanic.

(E) **Implement**, as a **group**, a final pre-production prototype of the game in PyGame which will:

    i. **revise** any issues raised by your tutor and/or your peers.

(F) **Write**, as a **group**, a presentation slide-deck and 2-page handout that will:

    i. **outline** the game design;
    ii. and **explain** the game design's commercial feasibility.

(G) **Present**, as a **group**, a 10-minute 'investment pitch' that will:

    i. **clarify** the game design contained in your presentation slide-deck and handout;
    ii. and **demonstrate** the final pre-production prototype of the game.

Assignment Setup

This assignment is a **product development task**. Fork the GitHub repositories at the following URL:

```
https://github.com/Falmouth-Games-Academy/comp150-game
```

Use the existing directory structure and, as required, extend this structure with sub-directories. Ensure that you maintain the `readme.md` file.

Modify the `.gitignore` to the defaults for **Python**. Please, also ensure that you add editor-specific files and folders to `.gitignore`.

Part A

Part A consists of a **single formative submission**. This work is **individual** and will be assessed on a **threshold** basis. Answer the following questions to pass:

- What is the title and high concept of the game?

- What is the intended aesthetic?

- What is the core mechanic?

- What makes the game fun?

- Is there a market for this type of game? Who is the target audience?

- What are the unique selling points?

- Is the scope appropriate for the product development time-frame?

To complete Part A, prepare the handout using any word processing tool. There is no submission.

Show the handout to your **tutor** for immediate **informal feedback**.

Part B

Part B consists of a **single formative submission**. This work is **individual** and will be assessed on a **threshold** basis. The following criteria are used to determine a pass or fail:

(a) Presentation is timely;

(b) The game concept can be understood;

(c) Proposed game concept will likely lead to a feasible game design.

To complete Part B, practice the delivery of the presentation. Ensure that you are comfortable with the presentation medium and discuss any concerns with your tutor. Then, attend the scheduled game concept elevator pitch session. Also, please ensure that you bring a sufficient number of copies of your handout to the session.

A formal presentation slide-deck (i.e. PowerPoint) is **not permitted**. However, additional visual, tactile, auditory, and/or olfactory aides are acceptable.

You will receive immediate **informal feedback** from **tutors** and **peers**.

In the session, a selection process will determine which concepts will be taken forwards to parts C—G.

Part C

Part C consists of a **single formative submission**. This work is **collaborative** and will be assessed on a **threshold** basis. The following criteria are used to determine a pass or fail:

(a) Only well-formed user stories are included;

(b) The plan is comprehensive;

(c) The plan is feasible.

To complete Part C, setup and populate the team Trello board. Ensure that all members of the team are added to the board. Show it to your tutor in the scheduled personal catch-up tutorial.

You will receive immediate **informal feedback** from your **tutor**.

Part D

Part D is a **single formative submission**. This work is **collaborative** and will be assessed on a **threshold** basis. The following criteria are used to determine a pass or fail:

(a) Submission is timely;

(b) Enough work is available to conduct a meaningful review;

(c) A broadly appropriate review of another team's work is submitted.

To complete Part D, prepare a draft version of the pre-production prototype. Ensure that the source code and related assets are pushed to GitHub and a pull request is made prior to the scheduled sprint review session. Then, attend the scheduled sprint review session.

You will receive immediate **informal feedback** from your **peers**.

Part E

Part D is a **single summative submission**. This work is **collaborative** and will be assessed on a **criterion-referenced** basis. Please refer to the marking rubric at the end of the brief for details on the criteria.

To complete Part D, revise the pre-production prototype based on the feedback you have received and finish any incomplete features. Please also ensure that you include appropriate screen-shots of the Trello board in a separate folder. Then, upload the source code to the LearningSpace. Please note, the LearningSpace will only accept a single `.zip` file. The recommended way of generating the zip file is using the *Download Zip* button on the GitHub website.

You will receive **formal feedback** three weeks after the final deadline.

Part F

Part F is a **single summative submission**. This work is **collaborative** and will be assessed on a **threshold** basis. Answer the following questions to pass:

- What is the title and high concept of the game?

- What is the intended aesthetic?

- What is the core mechanic?

- What makes the game fun?

- Is there a market for this type of game? Who is the target audience?

- What are the unique selling points?

- Is the scope appropriate for the product development time-frame?

To complete Part F, prepare the handout and presentation slide-deck using any word processing and/or presentation tool. Then, upload the relevant files to the LearningSpace. Please note, the LearningSpace will only accept a single `.zip` file.

You will receive **formal feedback** three weeks after the final deadline.

Part G

Part G is a **single summative submission**. This work is **collaborative** and will be assessed on a **criterion-referenced** basis. Please refer to the marking rubric at the end of the brief for details on the criteria.

To complete Part G, practice the delivery of the presentation. Ensure that you are comfortable with the presentation medium and discuss any concerns with your tutor. Then, attend the scheduled game design pitch and pre-production demo session. Please ensure that you bring a sufficient number of copies of your handout to the session. Please, also ensure that you setup a laptop with the presentation slide-deck and the pre-production demo ahead of time.

You will receive **formal feedback** three weeks after the final deadline.

Additional Guidance

Avoid poor planning and time management. By now this will be a familiar phrase, but it is no less true. In particular, avoid underestimating the effort required to implement even a simple game; always consider scope. From the pitch stage, you should consider very carefully what is feasible.

For the most part, your work will be marked as a group effort. However we want to avoid the situation where students try to "coast" through the assignment on their fellow group members' work, and equally the situation where one member of the group takes the lion's share of the work and prevents the others from contributing effectively. Marks will be weighted by a multiplier for **individual contribution**, which aims to penalise both of these behaviours. We assess this by several means, including but not limited to: sprint reviews; individual vivas; feedback from your peers; attribution in the source code; and GitHub commit logs. Any student who has contributed their *fair share* of effort to the project will receive a fair % for their effort, so any student who is putting in the appropriate level of effort has no need to worry. Note that effort is not the same as productivity.

The first step in planning your implementation should be to break your concept down into **user stories**. Your user stories should be **distinguishable** (i.e. there should be little overlap between them) and **easily measured** (i.e. it should be easy to tell when each user story has been implemented). They should also be **comprehensive**, i.e. the user stories should completely capture the desired functionality of the game, with no gaps. Imagine giving your user stories to a developer who has never seen a game of your target genre. Would they be able to implement the game correctly, or would they miss key features?

Your code will be assessed on **functional coherence**: how well the finished game corresponds to the user stories, and whether the game has any obvious bugs. Correspondence to user stories runs both ways: implementing

features that were not present in the design ("feature creep") is just as bad as neglecting to implement features.

Your code will also be assessed on **sophistication**. To succeed on a project of this size and complexity, you will need to make use of appropriate algorithms, data structures, libraries, and object oriented programming concepts. Appropriateness to the task at hand is key: you will **not** receive credit for complexity where something simpler would have sufficed.

Maintainability is important in all programming projects, but doubly so when working in a team. Use **comments** liberally to improve code comprehension, and carefully choose the **names** for your files, classes, functions and variables. Use a well-established commenting convention for **high-level documentation**. The open-source tool Doxygen supports several such conventions. Also ensure that all code corresponds to a sensible and consistent **formatting style**: indentation, whitespace, placement of curly braces, etc. Hard-coded **literals** (numbers and strings) within the source should be avoided, with values instead defined as constants together in a single place. Consider allowing some literal values, where appropriate, to be "tinkered" without changing the source code, e.g. by defining them in an external file read by the game on startup.

As with all assignments on this course, you are expected to display a level of **innovation and creative flair** befitting Falmouth University's reputation as a world-leading arts institution. We are looking for creativity in the design of your **game mechanics**; you will **not** be judged on the quality of your art assets. One approach to promoting creativity is **divergent thinking**: generating ideas by exploring many possible solutions. Often the most interesting ideas are **subversive**: they deliberately go against convention or obvious solutions.

FAQ

- **What is the deadline for this assignment?**
  Falmouth University policy states that deadlines must only be specified on LearningSpace. Please examine the assignment area where you located this document.

- **What should I do to seek help?**
  You can email your tutor for informal clarifications. For informal feedback, make a pull request on GitHub.

- **Is this a mistake?**
  If you have discovered an issue with the brief itself, the source files are available at:
  `https://github.com/Falmouth-Games-Academy/bsc-assignment-briefs`.
  Please make a pull request and comment accordingly.

Additional Resources

- Mitchell, S. (2013) SDL Game Development. Packt Publishing.

- Keith, C. (2010) Agile Game Development with Scrum. Pearson Education.

- Sims, C. and Johnson, H.L. (2012) SCRUM: A Breathtakingly Brief and Agile Introduction. Dymaxicon.

- `https://www.mountaingoatsoftware.com/agile/user-stories`

- `http://www.doxygen.org`

- `https://travis-ci.org`

Marking Rubric (Pre-Production Tasks)

This assignment is worth 40% of the overall mark for this module.

Criterion	Weight	Refer for Resubmission	Basic Competency	Basic Proficiency	Novice Competency	Novice Proficiency	Professional Competency
Sprint Reviews	40%	The student fails to participate in at least one sprint review.	The student participates in all sprint reviews. All sprint reviews result in a playable build.				
Appropriateness of User Stories and Sprint Plans	5% †	No user stories and/or sprint plans are provided.	Few user stories are distinguishable and easily measured. Sprint plans provide little support for the project.	Some user stories are distinguishable and easily measured. Sprint plans provide some support for the project.	Most user stories are distinguishable and easily measured. User stories correspond to the game design. Sprint plans provide much support for the project.	Nearly all user stories are distinguishable and easily measured. User stories clearly correspond to the game design. Sprint plans provide effective support for the project.	All user stories are distinguishable and easily measured. User stories clearly and comprehensively correspond to the game design. Sprint plans provide exemplary support for the project.
Functional Coherence	5% †	No gameplay elements have been implemented and/or the code fails to compile or run.	Few gameplay elements have been implemented. There are many obvious and serious bugs.	Some gameplay elements have been implemented. There are some obvious bugs.	Many gameplay elements have been implemented. There is some evidence of feature creep. There are few obvious bugs.	Almost all gameplay elements have been implemented. There is little evidence of feature creep. There are some minor bugs.	All gameplay elements have been implemented. There is no evidence of feature creep. Bugs, if any, are purely cosmetic and/or superficial.
Sophistication	10% †	No insight into the appropriate use of programming constructs is evident from the source code. No attempt to structure the program is evident (e.g. one monolithic source file).	Little insight into the appropriate use of programming constructs is evident from the source code. The program structure is poor.	Some insight into the appropriate use of programming constructs is evident from the source code. The program structure is adequate.	Much insight into the appropriate use of programming constructs is evident from the source code. The program structure is appropriate.	Significant insight into the appropriate use of programming constructs is evident from the source code. The program structure is effective. There is high cohesion and low coupling.	Exemplary insight into the appropriate use of programming constructs is evident from the source code. The program structure is very effective. There is high cohesion and low coupling.
Maintainability	20% †	There are no comments, or comments are misleading. Most variable names are unclear or inappropriate. Code formatting hinders readability.	The code is only sporadically commented, or comments are unclear. Some identifier names are unclear or inappropriate. Code formatting is inconsistent or does not aid readability.	The code is well commented. Some identifier names are descriptive and appropriate. An attempt has been made to adhere to a consistent formatting style. There is little obvious duplication of code or of literal values.	The code is reasonably well commented. Most identifier names are descriptive and appropriate. Most code adheres to a consistent formatting style. There is almost no obvious duplication of code or of literal values.	The code is reasonably well commented, with some Doxygen-compatible module documentation. Almost all identifier names are descriptive and appropriate. Almost all code adheres to a consistent formatting style. There is no obvious duplication of code or of literal values. Some literal values can be easily "tinkered".	The code is very well commented, with comprehensive Doxygen-compatible module documentation. All identifier names are descriptive and appropriate. All code adheres to a consistent formatting style. There is no obvious duplication of code or of literal values. Most literal values are, where appropriate, easily "tinkered" outside of the source.
Portability and Navigability	5% †	Game will not execute at all on another machine for reasons related to code portability which cannot be fixed easily due to its poor structure. The provided template has not been followed.	There were challenges executing the game, but these were resolvable. The directory structure inside the submitted zip file is unclear. The provided template has not been followed.	Several portability issues are present. The directory structure inside the submitted zip file is somewhat confusing. The provided template has mostly been followed.	Some portability issues are present. The directory structure inside the submitted zip file is adequate. The provided template has been followed.	Few portability issues are present. The directory structure inside the submitted zip file is mostly sensible. The provided template has been followed.	Almost no portability issues are present. The directory structure inside the submitted zip file is sensible. The provided template has been followed.

Criterion	Weight	Refer for Resubmission	Basic Competency	Basic Proficiency	Novice Competency	Novice Proficiency	Professional Competency
Team Cohesion	5% †	The group's professional conduct has been unacceptable, and/or the group has failed to function at all as a team. Agile working practices have not been used.	The group has demonstrated an emerging level of professionalism. Agile working practices have provided little support for the project.	The group has demonstrated a progressing level of professionalism, functioning adequately as a team. Agile working practices have provided some support for the project.	The group has demonstrated an appropriate level of professionalism, functioning somewhat effectively as a team. Agile working practices have provided much support for the project.	The group has demonstrated a high level of professionalism, functioning effectively as a cohesive team. Agile working practices have provided significant support for the project. There is evidence of some use of Travis CI to support a continuous integration approach.	The group has demonstrated an exemplary level of professionalism, functioning highly effectively as a cohesive team. Agile working practices have provided exemplary support for the project. Travis CI has been used to effectively support a continuous integration approach.
Use of Version Control	10%	GitHub has not been used.	Material has been checked into GitHub less frequently than once per sprint. All code has been checked into the Master branch.	Code has been checked into GitHub at least once per sprint. An attempt has been made to use branches.	Code has been checked into GitHub several times per sprint. Commit messages are clear, concise and relevant. Branches are used sensibly.	Code has been checked into GitHub several times per sprint. Commit messages are clear, concise and relevant. Branches are used somewhat effectively. There is evidence of engagement with peers (e.g. code review).	Code has been checked into GitHub several times per sprint. Commit messages are clear, concise and relevant. Branches are used effectively. There is significant evidence of engagement with peers (e.g. code review).
Individual Contribution	Multiplier for criteria marked †	The student has failed to contribute their "fair share" to the project, or has actively prevented others from doing so.					The student has contributed their "fair share" to the project, and has facilitated others in doing so.

Marking Rubric (Game Design Pitch)

This assignment is worth 10% of the overall mark for this module.

Criterion	Weight	Refer for Resubmission	Basic Competency	Basic Proficiency	Novice Competency	Novice Proficiency	Professional Competency
Basic Competency Threshold	40%	No individual and/or group pitch is delivered, or either pitch is inappropriate.	A broadly appropriate individual and group pitch is delivered.				
Presentation Skills	20% †	xxx xxx xxx	xxx xxx xxx	xxx xxx xxx	xxx xxx xxx xxx	xxx xxx xxx xxx	xxx xxx xxx xxx
Commercial Awareness	20% †	No evidence of commercial awareness.	Little commercial awareness is evident in the design. Game has few, if any, unique selling points. Target audience is unclear and/or is not channelled into the game design.	Some commercial awareness is evident in the design. Game has some unique selling points. Target audience is clear, but its relation to the game design is weak.	Much commercial awareness is evident in the design. Game has several unique selling points. Target audience and its relation to the game design is clear. There is a clear market for the game.	Significant commercial awareness is evident in the design. Game has several unique selling points. Target audience and its relation to the game design is clear. There is a clear market gap which the game could fill. There is a possibility the game will attract interest.	Exemplary commercial awareness is evident in the design. Game has several unique selling points. Target audience and its relation to the game design is clear. There is a clear and commercially attractive market gap which the game could fill. There is a possibility the game will attract investment.
Innovation and Creative Flair	20% †	No innovation and/or creativity. The game concept is a clone of existing works with only cosmetic alterations.	Little innovation and/or creativity. The game concept is derivative of existing works, with only minor gameplay alterations.	Some innovation and/or creativity. The game concept is derivative of existing works, but shows emerging divergent and/or subversive thinking in terms of gameplay.	Much innovation and/or creativity. The game concept is somewhat original, with an attempt at divergent and/or subversive thinking in terms of gameplay. The gameplay shows promise of fun and engagement.	Significant innovation and/or creativity. The game concept is original, with evidence of divergent and/or subversive thinking in terms of gameplay. The gameplay is somewhat fun and engaging.	Exemplary innovation and/or creativity. The game concept is highly original, with strong evidence of divergent and/or subversive thinking in terms of gameplay. The gameplay is fun and engaging.