# INTERACTION & INTERFACES

Version 1.0
Computing
COMP210

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## Introduction

In the games industry, emerging technologies have a tendency to disrupt our practice on a regular basis. As developers it is vital that we are able to adapt and move with the times. What is trending now will soon become industry norms and make way for new innovations. It is easy to become overwhelmed by the pace of technological change that our industry faces. This assignment aims to encourage you to embrace this tide of technology advancement, using experimentation, tinkering and play to make sense of new technologies and channel your inner creativity rather than frustration.

*Hacker definition: "A person who enjoys exploring the details of programmable systems and stretching their capabilities, as opposed to most users, who prefer to learn only the minimum necessary."*

*— Jargon File*

For this assignment, you are required to design, implement and then evaluate an interface. Your interface concept should build upon an existing screen based project such as the your COMP240 World Creation Project or another game of your choosing. However, you are required to port the interface to an immersive context such as augmented reality (AR) or virtual reality (VR). Once you have developed a functional prototype, you will use HCI methodologies to compare and contrast the new interface with the original screen based version.

This assignment is formed of several parts:

(A) **Write**, a proposal for a VR/AR interface that will:
  i. **state and justify** the game that will be the basis for your interface;
  ii. **assess** VR/AR market;
  iii. **outline** an initial design in detail;
  iv. and **list** the key requirements the prototype must fulfil.

(B) **Design** and **Implement** your interface:
  i. **improve** upon the design iteratively over the course of six weeks;

(C) **Evaluate** the final interface by:
  i. **choosing** an appropriate method;
  ii. **executing** the evaluation
  iii. **compare** the results from both interfaces

(D) **Present** your findings in the form of a video showcasing:
  i. the final interface;
  ii. how you carried out the evaluation;
  iii. and your findings.

Microsoft Hololens is a mixed reality system that will revolutionise the way we experience and interact with content.

### Part A

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

(a) Submission is timely;
(b) Choice of interface is feasible;
(c) research is comprehensive;
(d) Design is distinctive and has creative merit.

To complete part A, write your proposal in the `readme.md` document. Show this

to your tutor in-class. If acceptable, this will be signed-off.

### Part B

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

(a) Enough progress is made to conduct a meaningful review each week;
(b) A broadly appropriate evaluation of a peer's work is submitted.

To complete Part B, implement your interface utilising a fast, iterative development process. Demonstrate your progress to your tutor each week in class. You will receive immediate **informal feedback** from your **tutor** and **peers**.

### Part C

Part C is a **single summative submission**. This work is **individual** and will be assessed on a **criterion-referenced** basis. Please refer to the marking rubric at the end of this document for further detail.

To complete Part C, revise the interface design based on the feedback you have received. Then, upload photos and source code to the LearningSpace. Please note, the LearningSpace will only accept a single `.zip` file.

You will receive **formal feedback** from your **tutor** three weeks after the final submission deadline.

### Part D

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

(a) enough work is available to hold a meaningful discussion;
(b) there is evidence of meaningful research and analysis;
(c) No breaches of academic integrity.

To complete Part D, prepare a demonstration video of the interface that articulates the interface design, justifies your approach to evaluation, and provides insight into your evaluation results. Upload the video to the assignment area on the Learning Space prior to the deadline.

## Additional Guidance

Falmouth University is internationally renowned for the arts. Despite the fact that you are studying for a BSc degree in a technical discipline, you are still expected to strive for the same level of innovation and creative flair as your peers. This assignment is more heavily weighted towards the creative than the assignments you have completed thus far. On this assignment, a competent execution of an unimaginative idea is unlikely to achieve a high grade, as opposed to an imperfect execution of a unique and ambitious concept, which will be seen favourably by examiners. Consider this when working on your design. One approach to promote creativity is divergent thinking: generate ideas by exploring many possible solutions. Often the most interesting ideas are subversive: they deliberately go against the accepted or most obvious solution.

Whichever platform you choose, you may implement your component in C++, C#, Python, or a combination of these. Other languages may be permitted at the discretion of your tutor, if you can argue convincingly that it is appropriate for the proposed project. The design of your interface must be informed by

the usability and user-experience findings from assignment one.

The development process for your interface should be fast and iterative. In the first five weeks you will journey through the stages of discovery, interpretation and ideation. This will be followed by six weeks of prototyping through fast paced experimentation and evolution. At the end of each ?prototyping? week you should aim to have a fully functional prototype that has been improved considerably from the previous week.

Most VR/AR headset and peripheral manufacturers release their products with SDKs, plugins and game engine integration. This helps developers utilise these products in their own projects with ease. For this assignment you must not rely on the basic examples and demoes given away for free with the developer kits. You are expected to produce new code alongside using the appropriate libraries or plugins to create an interface that is unique, novel and innovative.

Stand on the shoulders of giants. Although you may be new to developing for AR/VR these types of systems have been around since the 1960s. In fact, stereoscopic photo viewers have been around since 1838 (see Charles Wheatstone). Large organisations such as Google, Facebook and many others are all investing massive sums of money in research, production and documentation for VR and AR. There is a wealth of information already out there that you will need to draw upon to create a successful response to the assignment.

You should aim to demonstrate a high level of sophistication in the technical execution of your prototype. An important part of sophistication is having the insight to choose the right tool for the job: if a simpler technique fulfils all the requirements, use it. The use of unnecessarily complicated techniques, serving only to showcase one's own cleverness, is a dangerous habit.

The sole purpose of the recorded demonstration is to aid the external moderators and examiners. Furthermore, any photos and/or videos submitted do not need to be entertaining or highly polished.

## FAQ

- **What is the deadline for this assignment?**
  Falmouth University policy states that deadlines must only be specified on the MyFalmouth system.
- **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 raise an issue and comment accordingly.

## Additional Resources

- Jerald, Jason. (2015) Human-Centered Design for Virtual Reality. ACM Books.
- http://www.gdcvault.com/play/1023649/Human-Centered-Design-of-Immersive
- http://www.gdcvault.com/play/1022810/Interaction-Design-in-VR-The
- https://docs.unity3d.com/Manual/VROverview.html
- https://play.google.com/store/apps/details?id=com.google.vr.cardboard.apps.d

# Marking Rubric

| Criterion | Weight | Refer for Resubmission | Adequate | Competent | Very Good | Excellent | Outstanding |
|---|---|---|---|---|---|---|---|
| Basic Competency Threshold | 30% | At least one part is missing or is unsatisfactory.<br>There is little or no evidence of an iterative development process and no improvement over time in regards to the quality of the design and build of the prototype. | Submission is timely.<br>Enough work is available to hold a meaningful discussion.<br>Clear evidence of a 'reasonable' iterative development process<br>Clear evidence of programming knowledge and communication skills.<br>No breaches of academic integrity. | | | | |
| Architect: Innovation and creative flair | 5% | No evidence of innovation and/or creativity. | Some evidence of emerging innovation and/or creativity.<br>The solution is purely derivative of existing products.<br>There is no evidence of divergent thinking. | Little evidence of emerging innovation and/or creativity.<br>The solution is mostly derivative, with some attempts at innovation.<br>There is evidence of an attempt at divergent thinking. | Much evidence of emerging innovation and/or creativity.<br>The solution is an interesting and somewhat innovative product.<br>There is some evidence of divergent thinking. | Considerable evidence of mastery of innovative and creative practice.<br>The solution is a novel and innovative product.<br>There is much evidence of divergent thinking. | Significant evidence of mastery of innovative and creative practice.<br>The solution is a unique and innovative product.<br>There is significant evidence of divergent thinking. |
| Architect: Functionality of the Interface | 20% | No interface is produced, or the interface is completely non-functional. | The interface has no functionality.<br>There are serious technical and/or constructional flaws. | The interface has some functionality.<br>There are obvious technical and/or constructional flaws. | The interface has much functionality.<br>There are minor technical and/or constructional flaws. | The interface has considerable functionality.<br>There are superficial technical and/or constructional flaws. | The interface has significant functionality.<br>The technical execution is flawless. |
| Architect: Sophistication:<br>Software<br>Electronics<br>Networking | 10% | The solution lacks even a basic level of sophistication in any of the three areas. | The solution evidences some sophistication in one or more of the three areas.<br>Some insight has been demonstrated in any area. | The solution evidences little sophistication in one or more of the three areas.<br>Little insight has been demonstrated in at least one of the areas. | The solution evidences much sophistication in one or more of the three areas.<br>Much insight has been demonstrated in at least one of the areas. | The solution evidences considerable sophistication in one or more of the three areas.<br>Considerable insight has been demonstrated in at least one of these areas. | The solution evidences significant sophistication in one or more of the three areas.<br>Significant insight has been demonstrated in at least one of these areas. |
| Research: Adequacy of Justification of Methods and Practice | 10% | There is no justification, or little of the justification is sound. | Some of the methodological justification is sound.<br>A few methodological limitations are acknowledged. | Most of the methodological justification is sound.<br>Appropriate literature has been referenced to support justifications.<br>A few key methodological limitations are acknowledged. | A considerable amount of the methodological justification is sound.<br>Appropriate literature has been acknowledged to support justifications.<br>Some key methodological limitations are acknowledged. | Nearly all of the methodological justification is sound.<br>Key literature is appropriately referenced to support justifications.<br>Nearly all methodological limitations are acknowledged and a few are explicitly addressed. | Nearly all of the methodological justification is sound.<br>Seminal literature is appropriately referenced while key literature offers rigorous support for justifications.<br>Nearly all methodological limitations are acknowledged and some are explicitly addressed. |
| Research: Depth of Discussion about Key Usability and User Experience Issues | 15% | Few meaningful connections are made between the findings. | Some meaningful connections are made between the findings.<br>Connections are largely descriptive in nature. | Many meaningful connections are made between the findings.<br>Connections are largely analytic in nature.<br>An attempt to tie together findings from the different evaluation methods is evident. | Considerable connections are made between the findings.<br>Connections are largely analytic in nature.<br>An attempt to synthesise findings from the different evaluation methods is evident. | Significant connections are made between the findings.<br>Connections are largely both analytical and evaluative in nature.<br>Triangulation, using different evaluation methods, has been used to support findings. | Extensive connections are made between the findings.<br>Connections are largely both analytical and evaluative in nature.<br>Triangulation, using different evaluation methods, has been used to effectively support and reinforce findings. |

| Criterion | Weight | Refer for Resubmission | Adequate | Competent | Very Good | Excellent | Outstanding |
|---|---|---|---|---|---|---|---|
| Research:<br>Ability to Discern Key Usability and User Experience Issues | 10% | Many key usability and user experience issues have been missed. | Several key usability and user experience issues have been missed. | Only some key usability and user experience issues have been missed. | Few, if any, key usability and user experience issues have been missed. | Few, if any, usability and user experience issues have been missed.<br>Key issues highlighted are pertinent to the play experience. | Few, if any, usability and user experience issues have been missed.<br>Key issues highlighted identified are priorities for improving the play experience. |