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Introduction

You are required to deliver a major **research project** as part of your degree; either in the form of **empirical research** relating to computing for games, or **practice-based research** related to game development. Individually, you explore a field that interests you, and for which there is a clearly identified need. This module forms the first part of this project and provides the opportunity to conduct a literature review, as well as to collect and analyse data using appropriate methods and statistics.

"Most papers in computer science describe how their author learned what someone else already knew."

— Peter Landin

"We can only see a short distance ahead, but we can see plenty there that needs to be done."

— Alan Turing

These assignments are formed of several parts:

(A) **Complete** an Application for Research Ethics Approval form, which will:
   (i) **briefly propose** the research to be undertaken in your project
   (ii) **outline** any potential ethical issues around your proposed work, particularly with respect to research involving human subjects
   Note that you *must* complete and submit Part A *before* carrying out any experimental work.

(B) **Deliver** a 15-minute presentation that will:
   (i) **explain** the context of your project
   (ii) **identify** and **discuss** the scientific literature relevant to your project
   (iii) **propose** one or more research questions for your project

(C) **Write** a draft research review and proposal that will:
   (i) **identify** and **analyse** the scientific literature relevant to your project
   (ii) **propose** one or more research questions for your project
   (iii) **justify** your choice of research question(s) and how they will contribute to the state of knowledge
   (iv) **outline** and **justify** the methodology to be used in addressing the research question(s)
   (v) **present** any preliminary results you have obtained so far

(D) **Write** a final research review and proposal that will:
   (i) **address** any issues raised in Part (C)

(E) **Produce** a prototype research artefact that will:
   (i) **facilitate** the collection of empirical data for your project
   (ii) **demonstrate** the technical feasibility of your proposed artefact
   (iii) **provide** a basis for further development and experimentation in the second study block

(F) **Deliver** a 15-minute presentation that will:
   (i) **summarise** the context and research question(s) of your project
   (ii) **outline** and **justify** the methodology to be used in addressing the research question(s)
   (iii) **present** any preliminary results you have obtained so far

Assignment Setup

These assignments form a **research** task, consisting of **academic reading**, **academic writing**, **software development** and **scientific experimentation**.
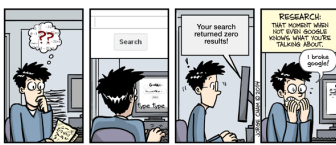
For the **prototype research artefact**, there is no set GitHub repository. However you are strongly encouraged to create one. Ensure that you set up the `.gitignore` file for your chosen development environment, and maintain the `readme.md` file.

For the **research review and proposal**, fork the GitHub repository at the following URL:

`https://github.com/Falmouth-Games-Academy/comp320-proposal`

Use the existing LaTeX template, which is based on the IEEE Transactions style, to write your literature review and proposal.

Part A

Part A consists of a **single formative submission**. This work is **individual** and will be assessed on a **threshold** basis.

To complete Part A, download the Research Ethics Approval Application Form from the COMP320 area on LearningSpace. Complete the form in consultation with your project supervisor. Note that you will need to write a (brief) research proposal for this form.

Print and sign the form, and hand it to your supervisor for approval.

Important: carrying out **any** experimental work without first completing Part A is a breach of Falmouth University's Research Ethics Policy. This will be treated as a case of academic misconduct, and penalised accordingly.

Part B

Part B consists of a **single formative submission**. This work is **individual** and will be assessed on a **threshold** basis. To pass, answer the following questions:

 (i) What is the context of your project? How does it fit into the research field of computing for games?
 (ii) What are the key results from the literature upon which your project will be built?
 (iii) What is the current state of knowledge in the field? What are the open questions and challenges?
 (iv) What is (are) the key research question(s) that you will seek to answer in your project?

To complete Part B, prepare a short (15-minute) presentation and deliver it in the scheduled session in week 7. Prepare your slides using your choice of presentation software (e.g. Beamer, reveal.js, PowerPoint).

Part C

Part C consists of a **single formative submission**, however your project supervisor may also set additional **formative submissions** at their discretion. This work is **individual** and will be assessed on a **threshold** basis.

To complete Part C, use the provided LaTeX template to write a literature review and proposal. Do **not** modify the formatting of the provided template. You are advised to bear in mind the page limit specified for Part D and attempt to adhere to it at this stage, however you will **not** be penalised for failing to do so.

Push your document to GitHub and open a pull request in advance of the scheduled peer review session.

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

Part D

Part D consists of a **single summative submission**, however your project supervisor may also set additional **formative submissions** at their discretion. This work is **individual** and will be assessed on a **holistic** basis, according to the descriptors set out at the end of this document.

To complete Part D, revise your document from Part C to address any issues highlighted during the peer review. Your document must not exceed **six pages** of text, excluding figures, tables, references and appendices. This is subject to the usual policy on word and page limits available on LearningSpace.

Upload your final `.pdf` file to the LearningSpace. Note that LearningSpace will only accept a single `.pdf` file.

You will receive immediate and continuous **informal feedback** through meetings with your supervisor. You will also receive **formal feedback** three weeks after the formative deadline.

Part E

Part E consists of a **single summative submission**, however your project supervisor may also set additional **formative submissions** at their discretion. This work is **individual** and will be assessed on a **threshold** basis.

To complete Part E, design and implement a piece of research software appropriate to your chosen project. Create a Trello board setting out the key requirements for the software, and identifying which requirements will be tackled this study block and which are stretch goals to be left until later. Check the source code into a version control repository regularly. Ensure your `readme.md` file contains any information required to build and run the artefact, if appropriate.

Upload a `.zip` file containing your source code, associated assets, and screenshots of your Trello board to the LearningSpace. Note that LearningSpace will only accept a single `.zip` file.

You will receive immediate and continuous **informal feedback** through meetings with your supervisor. You will also receive **formal feedback** three weeks after the formative deadline.

Part F

Part F consists of a **single formative submission**. This work is **individual** and will be assessed on a **threshold** basis. To pass, answer the following questions:

 (i) What is (are) the key research question(s) that you will seek to answer in your project?
 (ii) How will answering these questions contribute to the state of knowledge in the field of your project?
 (iii) What methodology will you use to seek answers to these questions? Justify your methodology.
 (iv) What preliminary results have you obtained?

To complete Part F, prepare a short (15-minute) presentation and deliver it in the scheduled session in week 13. Prepare your slides using your choice of presentation software (e.g. Beamer, reveal.js, PowerPoint).

Additional Guidance

Todo additional guidance.

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 make a pull request and comment accordingly.

Marking Descriptors: Prototype Research Artefact

Note that this assignment is **not** marked in a criterion-based fashion. Instead, your project supervisor will assign an overall grade by considering the following descriptors in relation to your project.

Criterion	Weight	Refer for Resubmission	Novice Competency	Novice Proficiency	Professional Competency	Professional Proficiency	Expert Competency
Ethics Approval	—	An ethics approval form has not been submitted. **This is an automatic fail, regardless of other criteria.**	Ethics approval has been sought and obtained.				
Basic Competency Threshold	—	Part F is not completed or is unsatisfactory.	A satisfactory presentation is delivered for Part F.				
Appropriateness of Requirements	—	Few requirements are distinguishable and easily measured. Requirements bear little correspondence to the proposed research.	Some requirements are distinguishable and easily measured. Requirements somewhat correspond to the proposed research.	Most requirements are distinguishable and easily measured. Requirements correspond to the proposed research.	Nearly all requirements are distinguishable and easily measured. Requirements clearly correspond to the proposed research.	All requirements are distinguishable and easily measured. Requirements clearly and comprehensively correspond to the proposed research.	All requirements are distinguishable and easily measured. Requirements clearly and comprehensively correspond to the proposed research.
Functional Coherence	—	Few features have been implemented, or the code fails to compile and run. Many obvious and serious bugs are detected.	Some features have been implemented. Some obvious bugs are detected.	Many features have been implemented. There is some evidence of feature creep. Few obvious bugs are detected.	Almost all features have been implemented. There is little evidence of feature creep. Some minor bugs are detected.	All features have been implemented. There is almost no evidence of feature creep. Some bugs, purely cosmetic and/or superficial in nature, are detected.	All features have been implemented. There is no evidence of feature creep. Few to no bugs are detected.
Sophistication	—	Little insight into the appropriate use of programming constructs is evident from the source code. The program structure is poor or non-existant.	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.	Considerable 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.	Significant 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.	Extensive insight into the appropriate use of programming constructs is evident from the source code. The program structure is extremely effective. There is very high cohesion and very low coupling.
Maintainability	—	The code is only sporadically commented, if at all, or comments are unclear. Few identifier names are clear or inappropriate. Code formatting hinders readability.	The code is somewhat 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 sensible formatting style. There is almost no obvious duplication of code or of literal values.	The code is reasonably well commented. Almost all identifier names are descriptive and appropriate. Almost all code adheres to a sensible formatting style. There is no obvious duplication of code or of literal values.	The code is very well commented. All identifier names are descriptive and appropriate. All code adheres to a sensible formatting style. There is no obvious duplication of code or of literal values.	The code is extremely well commented. All identifier names are descriptive and appropriate. All code adheres to a sensible formatting style. There is no duplication of code or of literal values.

Marking Descriptors: Research Review and Proposal

Note that this assignment is **not** marked in a criterion-based fashion. Instead, your project supervisor will assign an overall grade by considering the following descriptors in relation to your project.

Criterion	Weight	Refer for Resubmission	Novice Competency	Novice Proficiency	Professional Competency	Professional Proficiency	Expert Competency
Ethics Approval	—	An ethics approval form has not been submitted. **This is an automatic fail, regardless of other criteria.**	Ethics approval has been sought and obtained.				
Basic Competency Threshold	—	Parts B and C are not completed or are unsatisfactory. Referencing of sources is unsatisfactory.	A satisfactory presentation is delivered for Part B. The student participates in the peer review activity for Part C, with enough work present for a meaningful review. Sources are referenced, with no obvious errors or omissions.				
Breadth of literature review	—	The literature review is missing or unsatisfactory. Many key sources are omitted.	The literature review falls far short of comprehensive. There are many obvious omissions.	The literature review falls short of comprehensive. There are some obvious omissions.	The literature review is somewhat comprehensive. There are few obvious omissions.	The literature review is very comprehensive. There are very few obvious omissions.	The literature review is extremely comprehensive. There are no obvious omissions.
Depth of insight	—	Little insight is demonstrated. Papers are summarised in the student's own words.	Some insight is demonstrated. Attempts are made at discussion beyond summary.	Much insight is demonstrated. Discussion is inferential in nature.	Considerable insight is demonstrated. Discussion is analytical in nature.	Significant insight is demonstrated. Discussion is analytical and evaluative in nature.	Extensive insight is demonstrated. Discussion is analytical and evaluative in nature.
Specificity, verifiability & accuracy of claims	—	Few claims have a clear source of evidence. Significant errors and/or misinterpretations.	Some claims have a clear source of evidence. Many errors and/or misinterpretations.	Many claims have a clear source of evidence. Some errors and/or misinterpretations.	Most claims have a clear source of evidence. Few errors and/or misinterpretations.	All claims have a clear source of evidence. Almost no errors and/or misinterpretations.	All claims have a clear source of evidence. No errors and/or misinterpretations.
Quality of research question(s)	—	Research questions are absent or not satisfactory.	Research questions show basic understanding of the field. Research questions are unambitious or unoriginal.	Research questions show strong understanding of the field. Research questions are original.	Research questions show some insight into the field. Research questions are original and ambitious.	Research questions show much insight into the field. Research questions are original, ambitious and timely.	Research questions show significant insight into the field. Research questions are at the cutting edge of the field.
Methodology	—	Methodology is not specified, not justified, or either of these is unsatisfactory.	The proposed methodology is somewhat plausible. The justification is not very convincing.	The proposed methodology is plausible. The justification is somewhat convincing.	The proposed methodology is sound. The justification is convincing.	The proposed methodology is very sound. The justification is very convincing.	The proposed methodology is extremely sound. The justification is extremely convincing.
Preliminary results	—	No preliminary results are presented.	Preliminary results are basic.	Preliminary results are verging on significant.	Preliminary results are significant.	Preliminary results show progress towards publishable quality.	Preliminary results are already of publishable quality.

Appendix: British Computer Society Requirements

An individual project is an expectation within undergraduate, integrated masters, and postgraduate masters programmes in computing. Students must be provided with written guidance on all aspects of the project, including selection,conduct, supervision, milestones, format of the report and the criteria for assessment. All projects should reflect the aims and learning outcomes which characterise the programme to which they contribute as set out in the programme specification.

It is expected that within an undergraduate programme, students will undertake a major computing project, normally in their final year and normally as an individual activity, giving them the opportunity to demonstrate:

- their ability to apply practical and analytical skills present in the programme as a whole
- innovation and/or creativity
- synthesis of information, ideas and practices to provide a quality solution together with an evaluation of that solution
- that their project meets a real need in a wider context
- the ability to self-manage a significant piece of work
- critical self-evaluation of the process

Projects must involve the production of a report which should include:

- Elucidation of the problem and the objectives of the project
- an in-depth investigation of the context and literature, and where appropriate, other similar products (this section is likely to be emphasised less for an IEng project)
- where appropriate, a clear description of the stages of the life cycle undertaken
- where appropriate, a description of how verification and validation were applied at these stages
- where appropriate, a description of the use of tools to support the development process
- a critical appraisal of the project, indicating the rationale for any design/implementation decisions, lessons learnt during the course of the project, and evaluation (with hindsight) of the project outcome and the process of its production (including a review of the plan and any deviations from it)
- a description of any research hypothesis
- in the event that the individual work is part of a group enterprise, a clear indication of the part played by the author in achieving the goals of the project and its effectiveness
- references

In the event of this major activity being undertaken as part of a group enterprise, there is a requirement that the assessment is such that the individual contribution of each student is measured against all the above learning outcomes.

For accreditation for CITP, CEng or CSci, the individual project should be worth at least 30 credit points at level 6 or above. The project must be passed without compensation. For accreditation for IEng the individual project should be worth at least 20 credit points at level 5 or above. The project must be passed without compensation.