

RESEARCH ARTEFACT & DISSERTATION

Version 1.1
BSc Computing for Games
COMP360

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Introduction

These assignments form the second part of your **major research project**; whether **empirical research** relating to computing for games, or **practice-based research** in game development. It is your opportunity to collect and analyse primary data and prepare a manuscript to disseminate your findings.

Together, they are formed of several parts:

- (A) **Complete** your research artefact, ensuring that you:
 - (i) **apply** a rigorous software project management approach;
 - (ii) and **follow** best practices in software engineering.
- (B) **Collect** data relating to your research question, ensuring that you:
 - (i) **apply** a rigorous research method;
 - (ii) **leverage** your research artefact appropriately;
 - (iii) and **conform** with all ethical requirements.
- (C) **Deliver** a 20-minute presentation that will:
 - (i) **analyse and synthesise** your findings.
- (D) **Write** a 12-page academic dissertation in IEEE format that will:
 - (i) **identify** and **review** the scientific literature relevant to your project;
 - (ii) **outline and justify** one or more research questions;
 - (iii) **outline and justify** the methodology applied in addressing the research question(s);
 - (iv) **analyse** data you have obtained;
 - (v) as well as **interpret and discuss** your findings.
- (E) **Prepare** the final 12-page academic dissertation in IEEE format that will:
 - (i) **address** any issues raised through peer-review;
 - (ii) **and evaluate** the outcome of the research project.
- (F) **Deliver** a 20-minute presentation that will:
 - (i) **showcase** the final research artefact;
 - (ii) and **defend** the claims made in the academic dissertation.

"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

Assignment Setup

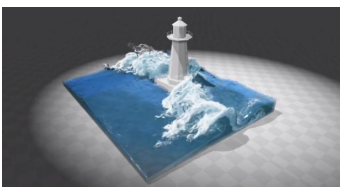
These assignments form a **research task**, consisting of **academic reading**, **academic writing**, **software development**, and **scientific experimentation**.

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 dissertation**, continue using 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 dissertation.



Part A

Part A consists of a **single summative submission**. However, your supervisor may 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 A, implement your research artefact and show it to your research supervisor in a timetabled meeting. As the requirements for the research artefact will vary by project, consult with your supervisor to verify whether or not the artefact is adequate for the desired purpose.

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

Then, upload a .zip file containing the final version of your source code and any assets/dependencies to the LearningSpace. Note that LearningSpace will only accept a single .zip file.

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

Part B

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

To complete Part B, collect data and codify it into a digital dataset. Show this to your research supervisor in a timetabled meeting. As the research questions and methods will vary, consult with your supervisor to verify whether or not the data is adequate for the desired purpose.

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

Important: Carrying out **any** data collection or experimental work without first securing ethical approval is a breach of Falmouth University's Research Ethics Policy. This will be treated as a case of academic misconduct, and penalised accordingly.

Part C

Part C 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) Why have you applied particular methods in seeking answers to these questions?
- (iv) What results have you obtained?
- (v) How have you analysed and interpreted these results?
- (vi) What are you likely to conclude on the basis of this research?
- (vii) What are the potential implications of your discoveries?

To complete Part C, prepare a 20-minute presentation and deliver it in the scheduled session. Prepare your slide-deck using your choice of presentation software (e.g. Beamer, reveal.js, PowerPoint). You may extend your existing slides from COMP320, but must incorporate new material and new findings.

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

Part D

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

To complete Part D, prepare a draft of the dissertation. This should *build upon* and *extend* your research proposal and literature review. As such, overlap with the COMP320 submission is expected. However, there should be new material. Use the provided LaTeX template and do **not** modify the formatting. Bring these to meetings with your supervisor.

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

Then, bring **two physical print-outs** of your dissertation to the timetabled peer-review session. You are advised to consider the specified page limit and attempt to adhere to it at this stage; although, you will **not** be penalised at this point for failing to do so. Also, ensure you also bring pens and highlighters.

You will receive immediate **informal feedback** from peers and *in the following week* a **meta-review** from tutors.

Part E

Part E consists of a **single summative submission**. However, your supervisor may 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 E, revise your manuscript to address any issues highlighted during the peer review. Your document must not exceed **twelve pages** of text, excluding figures, tables, references and appendices. This is subject to the policy on word and page limits available on the LearningSpace course page.

As an addendum to the research manuscript, an appendix containing at most one-page of critical reflection and self-evaluation should be incorporated. This should be a critical appraisal of the project, indicating the rationale for any key decisions, lessons learnt, and evaluation (with hindsight) of the process and outcome of the project.

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

You will 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 was the purpose of your research?
- (ii) How did you approach the research?
- (iii) What did you discover?
- (iv) What are the implications of your findings?

To complete Part F, prepare a 20-minute presentation in the timetabled session after the submission deadline. Prepare your slides using your choice of presentation software (e.g. Beamer, reveal.js, PowerPoint).

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

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: Research Artefact (30%)

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 & Academic Conduct | — | Ethical approval not obtained or evident lack of academic integrity. | Ethics approval has been sought and obtained. Academic conduct is acceptable. | | | | |
| Novice Competency Threshold | — | Any criterion not achieved at the novice competency. | Research artefact is relevant and satisfactory. All novice competency criteria are met. | | | | |
| Requirements | — | | 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 | — | | Some useful and relevant features have been implemented. Some obvious bugs are detected. | Many useful and relevant features have been implemented. There is some evidence of feature creep. Few obvious bugs are detected. | Almost all pertinent features have been implemented. There is little evidence of feature creep. Some minor bugs are detected. | All pertinent features have been implemented. There is almost no evidence of feature creep. Some bugs, purely cosmetic and/or superficial in nature, are detected. | All pertinent features have been implemented. There is no evidence of feature creep. Few to no bugs are detected. |
| Sophistication | — | | 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. | Significant insight into the appropriate use of programming constructs is evident from the source code. The program structure is highly effective, with high cohesion and low coupling. | Extensive insight into the effective use of programming constructs is evident from the source code. The program structure is impressive, with very high cohesion and low coupling. |
| Maintainability | — | | The code is somewhat well commented. Some identifier names are descriptive and appropriate. Most code adheres to a sensible 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. |
| Validation & Verification | — | | Some evidence of source code validation and verification. Basic unit testing is evident. | Much evidence of source code validation and verification. Basic unit testing is evident, with much coverage. | Considerable evidence of source code validation and verification. Sophisticated unit testing is evident, with considerable coverage. Appropriate testing techniques beyond unit testing have been applied, with some effectiveness at improving integrity/quality. | Significant evidence of source code validation and verification. Sophisticated unit testing is evident, with considerable coverage. Appropriate testing techniques beyond unit testing have been applied, with much effectiveness at improving integrity/quality. | Extensive evidence of source code validation and verification. Sophisticated unit testing is evident, with significant coverage. Innovative or cutting-edge testing techniques have been applied, with considerable rigor. |

Marking Descriptors: Dissertation (70%)

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 & Academic Conduct | — | Ethical approval not obtained or evident lack of academic integrity. | Ethics approval has been sought and obtained. Academic conduct is acceptable. | | | | |
| Novice Competency Threshold | — | Any criterion not achieved at the novice competency. | Satisfactory presentations are delivered. Adequate participation in peer review exercises, with enough to enable meaningful review alongside critical and constructive comments provided to peers. All novice competency criteria are met. An appropriate number of academic sources are referenced. All academic sources are referenced appropriately, with no obvious errors or omissions. All important claims are well-specified, verifiable, and accurate. | | | | |
| Abstract | — | | A general overview of the dissertation is provided. There is some structure. | A concise, but targeted summary of key points in the dissertation is provided. There is much structure. | A concise, but highly targeted outline of the purpose and key claims made in the dissertation is provided. The abstract broadly incorporates and follows the OCAR elements. | A concise, but highly targeted outline of the relevant academic discourse and potential contributions made in the dissertation is provided. The abstract incorporates and follows the OCAR elements. | A concise, but impressively highlighted gap in the literature and outline of intellectual contributions made in the dissertation to plug that gap is provided. The abstract incorporates and follows the OCAR elements. The key contribution of the dissertation is made clear in the abstract. |
| Introduction | — | | Introduction has much structure. The field of research is somewhat contextualised. | Introduction has much structure. The field of research is somewhat contextualised and motivated. | Introduction has considerable structure. The motivation for the research is somewhat justified. | Introduction has considerable structure. The motivation for the research is clearly justified. | Introduction has significant structure. The potential impact of the research is justified effectively. |
| Literature Review | — | | The literature review falls short of being comprehensive, but has some merit. Synthesis is adequate, hinting at a need for the work. | The literature review falls short of comprehensive, but has much merit. Synthesis is appropriate, highlighting a need for the work. | The literature review is somewhat comprehensive, having considerable merit. Synthesis is effective, criticising existing work to reveal a gap. | The literature review is comprehensive, having significant merit. Synthesis is effective, criticising existing work to reveal a key gap. | The literature review is comprehensive, incorporating all important seminal and contemporary works. Synthesis is highly effective, critically evaluating existing work to showcase an important gap. |

| Criterion | Weight | Refer for Resubmission | Novice Competency | Novice Proficiency | Professional Competency | Professional Proficiency | Expert Competency |
|---------------------------------|--------|------------------------|--|---|---|--|---|
| Research Questions & Hypotheses | — | | Research questions suggest a basic understanding of concepts and principles in the field. | Research questions suggest a broad understanding of concepts and principles in the field. Research questions are original. Where relevant, hypotheses are made clear. | Research questions suggest a thorough understanding of the field as well as some insight into its discourse. Research questions are original and ambitious. Where relevant, hypotheses are made explicit, clear, and well-formed. | Research questions suggest a thorough understanding of the field as well as much insight into its discourse. Research questions are original, ambitious, and timely. Where relevant, hypotheses are made explicit, clear, and well-formed. | Research questions suggest an comprehensive understanding of the field as well as significant insight into its discourse. Research questions are at the cutting edge of the field. Where relevant, hypotheses are stated explicitly with precision. |
| Methodology | — | | The methodology applied could plausibly lead to a somewhat meaningful claim. Methods are justified. | The methodology applied could plausibly lead to a meaningful claim. The methodology and integrity of the research are justified. | The applied methodology is scientifically rigorous, and potentially able to lead to a sound claim. The methodology and integrity of the research justified somewhat convincingly. | The applied methodology is scientifically rigorous, and quite likely to lead to a sound claim. The methodology and integrity of the research justified convincingly. | The applied methodology is extremely scientifically rigorous, perhaps a gold standard, and highly likely to lead to a sound claim. The methodology and integrity of the research are justified very convincingly. |
| Results & Analysis | — | | The results and their analysis is basic. | The results and their analysis approach sophistication. The method of analysis is appropriate to the project. | The results and their analysis are somewhat sophisticated and reflect good practice. The method of analysis is appropriate to the project. | The results and their analysis are highly sophisticated and reflect good practice. The method of analysis is suited and tailored to the project. Some care has been taken to guard against potential criticisms of the analysis and its assumptions. The analysis shows progress towards publishable quality. | The results and their analysis are very highly sophisticated and could be considered best practice. The method of analysis is not only suited and tailored to the project. Much care has been taken to guard against potential criticisms of the analysis and its assumptions. The results and analysis is of publishable quality. |
| Discussion & Conclusion | — | | Some insight into the topic is evident. Attempts are made at discussion beyond summary. | Much insight into the topic is evident. Discussion is inferential in nature. Key take-away points can be inferred from the work. | Considerable insight into the topic is evident. Discussion is analytical in nature. The limitations of the research are made clear. Key take-away points are made clear in the conclusion. | Significant insight into the topic is evident. Discussion is both analytical and evaluative in nature. The limitations of the research are made explicitly clear. Meaningful take-away points are made clear in the conclusion. There might be recommendations. | Extensive insight into the topic is evident. Discussion is both analytical and evaluative in nature. The limitations of the research have been thought through well, with their mitigation and/or acknowledgement made explicitly clear. Meaningful contributions to discourse in the field are made clear in the conclusion alongside key recommendations/impact. |
| Critical Evaluation | — | | Some relevant and critical self-appraisal. | Much relevant and critical self-appraisal. Outcomes and lessons learned are made clear, and loosely tied to goals to improve. | Considerable self-appraisal which is both relevant and critical in nature. Outcomes and lessons learned are analysed and tied to somewhat well-formed SMART objectives. | Significant self-appraisal which is both pertinent and critical in nature. Outcomes and lessons learned are analysed in much depth and clearly tied to well-formed SMART objectives. | Extensive self-appraisal which is both pertinent and critical in nature. Outcomes and lessons learned are analysed in considerable depth and tied explicitly to well-formed SMART objectives. Evaluation of the project leads to recommendations that others could leverage to improve their research. |

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.