

Spike: Task 32

Title: Research Plan

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Instructions

From Doubtfire: “This credit-level document is required before you undertake a HD research report. This enables staff to give you feedback on the plan and help you succeed in your research activities. The plan counts towards your credit-level outcomes, even if you do not undertake the research work. Additional artefacts created for a HD Research outcome must be submitted or linked in Task 34.”

From lecture notes: look for an interesting A vs B question to address in a research report. Your plan for this report should be several simple sentences that outline the context or domain of the research, the gap or problem, how you intend to investigate the question, any data that will be produced or results that you expect, and any implications the expected result may have.

Research Plan

During the semester, in one of the lectures on software patterns, the component pattern and entity-component systems (ECSs) were discussed as powerful tools for getting greater performance out of games. However, a full-on ECS is very structurally different from inheritance-based, game object-oriented programming that students have been familiarising themselves with. Furthermore, from my own experience with Unity’s ECS in my capstone project, such systems can be uncooperative depending on the selected or required game object architecture.

In my research report, I shall investigate how and why ECSs afford differences in performance, the magnitude of such gains (or losses) current ECSs from various game engines can afford, and what constraints developers will have to manage to gain performance from an ECS.

I do not know what to expect for how and why ECSs can afford performance gains to games beyond that it revolves around their abilities to process large batches of simple data; the underlying mechanisms of this are unfamiliar to me, and will comprise part of this research. With regards to constraints however, I expect to find that at the current stage of development of publicly available ECSs, games and parts of games that involve processing simple variables of many game entities will get better performance by using an ECS, particularly if they can integrate them from the beginning of development, whereas games that make heavy use of complex game objects, even if they employ many of them, will struggle to gain performance from an ECS, even lose performance from using one.

If my findings regarding constraints of ECSs support my expectations, I shall suggest some recommendations for optimally using an ECS.

Technologies, Tools, and Resources to be Used

- Mozilla Firefox (for conducting the research for the report, using Google Scholar, the Swinburne Library and other online resources as appropriate to gather information required for this report).
- Microsoft Word (for writing the report).
- Learning materials on Canvas (for informing the research where appropriate).

Deliverables / Artefacts to be Produced

- A PDF report document outlining how ECSs offer differences in performance, the magnitude of any gains that can be obtained, constraints on the use of ECSs, and any recommendations for optimal use of ECSs.