

Capstone Project Proposal

Project Name: Virtual Pet Simulator

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Content

Document Details.....	3
Executive Summary.....	4
Project Description/Overview.....	4
Product Related Technologies	4
Project Management Related Technologies	5
Project/Product Deliverables	5
Educational / Professional Practice Objectives (High level)	6
Methodology.....	6
Required Research	7
SAAD Components	7
Team Structure / Role Descriptions	7
Risks Analysis and Assumptions.....	8
Planning for Quality	9
Notes.....	10

Document Details

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Document Approval:

Comments: All team members' input/approval are required before submission.	
Approved by:	MM, WB, CC, RS, JJ
Project Manager:	Rose Scoville
Date:	February 2, 2022

Executive Summary

The purpose of this project is to work as a team to produce a Virtual Pet Simulator, as per Capstone project requirements, by the end of the Winter 2022 semester. The project will involve several different technologies including, but not limited to, Unity as an IDE, MySQL for database scripting, and Laravel for front-end web development. Project management technologies will include Git for source control, Bitbucket for version control, and Jira for project management and reporting.

The project is broken down into a series of 7 deliverables concluding on April 14, 2022. The deliverables are focused on the core aspects of the virtual pet, including lifespan, hunger, hygiene, happiness, sickness, and fussiness. Documents will be created outlining a hypothetical second phase involving a web-based user database for user battles. The project is designed to meet a series of high-level user objectives based on our position as graduating students at NSCC.

We will be using Kanban as a project management methodology, as well as a series of SAAD components, including user flow documents and a dynamic project Gantt chart. We have also identified 9 key roles to be filled by members of the team at various stages of the project. Plans have also been made to meet QA standards.

Project Description/Overview

The project's objective is to develop a Unity-based application for a virtual pet simulator by the end of the Winter 2022 semester, according to Capstone project requirements. The application will give users the opportunity to hatch and raise a virtual pet. Documents will be created outlining a hypothetical second phase wherein users can battle their virtual pets asynchronously with other users.

Product Related Technologies

1. Unity (IDE)
2. C# (back-end/application language)
3. WebGL (application-web migration)
4. MySQL (database)
5. PHP (front-end/web language)
6. Laravel (front-end/web language)
7. CSS (front-end styling)
8. Aseprite (asset creation)
9. Microsoft's Internet Information Services (HTTP hosting)

Project Management Related Technologies

1. Git (source control)
2. Bitbucket (version control)
3. Jira (project management and reporting)
4. Discord (team communication)
5. Microsoft Teams (client communication)
6. InVision (wireframing and mock-ups)
7. Visual Paradigm (ERD)

Project/Product Deliverables

Capstone Project Deliverables

1. Initial Project Proposal (due January 24, 2022)
2. Formal Project Proposal (due February 3, 2022)
3. Project Plan (due February 17, 2022)
4. Milestone 1 Report (due March 3, 2022)
5. Milestone 2 Report (due March 24, 2022)
6. Project Presentation (due April 7, 2022)
7. Project Reflections Report (due April 14, 2022)

Product Deliverables: Should Do

1. Virtual Pet care stats and associated activities
 - a. Lifespan / Growth
 - b. Hunger / Feeding
 - c. Hygiene / Cleaning
 - d. Happiness / Playing
 - e. Sickness / Medicine
 - f. Fussiness / Discipline
2. Pet derivative stats
 - a. Age
 - b. Weight
 - c. Raising Mistakes (tracked but hidden from player)
3. Minigame for playing activity
4. Egg and Child life stages
5. One type of pet
6. Pet assets and animations

7. Background art assets
8. Audio assets

Product Deliverables: Could Do

1. MySQL database for storing user data and high scores
2. Website for displaying high scores
3. Game deployed onto website for browser play
4. Asynchronous multiplayer allowing combat between two player's pets
5. Pet combat stats and ability to improve them
 - a. Strength
 - b. Speed
 - c. Health
 - d. Defense
6. Adult life stage
7. Multiple choices of pet

Educational / Professional Practice Objectives (High level)

1. To participate in and cooperate with a small team to manage a project and produce a final product
2. To apply and combine prior coursework knowledge (from both coding and non-coding related courses) to a larger project
3. To practice professional and effective communication between both team member and clients
4. To complete a project based on milestones, phases, and deliverables, according to a designated project management methodology
5. To produce a product worthy of a professional portfolio

Methodology

Kanban

1. A Kanban board to visually indicate tasks in the backlog, in progress, in review, and completed. The entire team is responsible for the board as there is no "Scrum master" or any roles in Kanban.
2. Kanban's ongoing flow, as opposed to Scrum's fixed length sprints, affords us the flexibility to work around our diverse and sometimes unpredictable schedules.
3. Work-in-progress limits will assist us in identifying bottlenecks before they can become a larger problem.

Required Research

1. Project management methodologies: Agile methodology comparison for project specifics, Scrum, Kanban (to be done by all team members)
2. Project management: Jira vs. Trello (to be done by Project Manager)
3. Version control: Bitbucket vs. GitHub (to be done by Project Manager and Development Lead)
4. Unity (to be done by all application development team members)
5. Web integration and deployment (to be done by all web development team members)
6. Database Connection to Unity (to be done by all database team members)

SAAD Components

1. Game design document
2. Project Gantt chart (this will be the Roadmap in Jira)
3. Kanban project board (this will fulfil the function of the Agile Project Plan)
4. Project Backlog
5. Entity relationship diagram (ERD)
6. User flows
 - a. Task flows
 - i. Main flow
 - ii. Feed flow
 - iii. Sleep flow
 - iv. Play flow
 - v. Heal flow
 - vi. Stats flow
 - vii. Scold flow
 - b. Wire flow
7. Quality Assurance Plan
8. Project documentation library (via Discord)
9. Meeting minutes (via Discord)

Team Structure / Role Descriptions

1. **Project Manager (PM):** Organizes the project and ensures all teams have what they need to get the job done. Helps facilitate communication between teams when needed.

2. **Lead Game Designer:** Writes and updates the game design document describing gameplay in non-technical terms. Takes the disparate ideas from design team and brings them together into one cohesive vision.
3. **Lead Developer:** Helps guide development team and provides resources, instruction, and demonstrations for working with Unity.
4. **Lead UI/UX Developer:** Creates an appealing UI/UX to interact with game functionality.
5. **Lead Database Developer:** Creates the database and integrates its functionality into the standalone windows build, and later the WebGL build.
6. **Lead Web Developer:** Creates a website that displays the WebGL build and database data.
7. **Design Team:** Works with the Lead Game Designer and Lead Visual Designer to create the look and feel of the product.
8. **Development Team:** Works with the Lead Developer, Lead Database Developer, and Lead Web Developer to write the code that gives the product its functionality described in the game design document.
9. **Quality Assurance Manager (QAM):** Maintains the QA Plan, Change Log, Library of SAAD documentation and Library of QA specific documentation.

Risks Analysis and Assumptions

Risks and Mitigations

1. Risk 1: Intellectual property (IP) and trademark infringement
 - a. Mitigation A: Avoid all trademarked IP (e.g., Toho's Kaiju properties, Tamagotchi-owned terminology).
 - b. Mitigation B: Application is not to be published with any IP not owned by the team.
2. Risk 2: External work, life, and commitments overload
 - a. Mitigation A: Team members are to try to be self-aware and communicate early to the rest of the team when life events, work overload, or burn-out might become an issue. The team will then re-delegate tasks appropriately and/or adjust project requirements as needed to meet deadlines.
3. Risk 3: Covid 19
 - a. Mitigation A: Team members will adhere to all publicly required health and safety policies.
4. Risk 4: Technical difficulties due to unforeseen circumstances (e.g., storm-related power outages)
 - a. Mitigation A: In the event of postponed work due to unforeseen events, the team will adjust project requirements as needed to meet deadlines.

Assumptions

1. The team will have five contributing team members throughout the project's duration.
2. Team members will be responsible for and complete all self-assigned/accepted work.
3. If any work is too much for a team member, they will communicate this early.
4. Team members will be communicative during agreed-upon meeting times (i.e., Capstone class hours and additional pre-set meetings if needed).

Planning for Quality

QA Organization, Tasks, and Responsibilities

Designated roles):

Quality Assurance Manager (QAM)

The QAM will maintain:

1. QA Plan
2. Change Log
3. Library of SAAD / design documentation
4. Library of QA specific documentation

QA Specific Documentation Required

1. Quality Assurance Plan
2. Test Plan
3. Programmer's Reference Manual
4. Change Log (document all changes to the final product that affect milestones already past)

Tools, Techniques, and Methodologies

- Tools

Developers will use Unity as an IDE and Git/Bitbucket for source/version control. Developers will use version 2020.3.26f1 of Unity. MySQL will be used as the database.

- Techniques

All files created by the developers should have saved copies whenever changes were made. These files should be committed to the repository accessible by all project members.

- Methodologies

- During testing, a separate branch of the repository will be used to maintain the integrity of the main branch.
- A Kanban board will be used to track known bugs, bugs being worked on, and bugs that have been fixed.

Media Control, Records Collection, Maintenance, and Retention

1. The development team will use source control via Bitbucket to version and backup all project code. This will be done via the following steps:
 - a. Cloning: developer clones the main development branch from the project's repository into the local environment.
 - b. Branching: developer creates a new feature-specific or bug-specific branch directly from the Jira issue on the project board, or from the issue as displayed on Jira issue list in Bitbucket. In the local environment, the developer will switch to the issue branch as the working branch. This is the branch used for commits.
 - c. Pushing and creating Pull Requests: after the feature is developed or the bug is resolved, the developer then pushes the issue branch to the project repository. After pushing, the developer creates a pull request for the Quality Assurance (QA) Lead to review prior to merging this issue's branch into main.
2. The use of pull requests (PR) will allow other team members to comment on code and ensure code quality and compatibility prior to merging into the main branch. Pull request commenting will also maintain an ongoing record of issue discussions.
3. Developers should keep their local copies of the project code up to date by syncing with the project's source code regularly. This will create multiple backups of all code that will allow us to restore the project should anything happen to the Bitbucket repository.

Notes

1. Art and Audio will use placeholder assets for the Capstone project but will be updated post-semester if we choose to continue the project. This is largely where Risk 1 will be relevant.