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Software Engineering

- Based on the idea that computer scientists should create software the way architects create buildings.
  - **Understanding** of what the software will do.
  - **Analysis** of the necessary software components.
  - **Planning** of the development of each component.
  - **Coordination** of the team and the development.
The Design Document

- The design document describes all aspects of your game, without actually creating code.
  - Acts as a contract between designer and client.
  - Also acts as a blueprint for future developers.
Design Document Components

- **Software Design Documents (SDDs)** often outline the following:
  - High level summary.
  - Background on project domain (definition of terms, etc).
  - The game requirements, and how to achieve them.
  - Constraints (both technical and non-technical).
  - Development procedures and coding guidelines.
  - Languages and tools that will be used.
  - Definitions of variables and a description of their usage
  - Logical structure and logical processing steps.
  - Error, alarm and warning messages.
  - Performance & reliability.
Things to consider

- The #1 item when creating a document:
  - Do not approach any document like a checklist.
    - The list items on the previous page are a reminder of what you need, not a linear set of instructions to follow.
    - There has to be a sense of flow and cohesion.

- The #2 item when creating a document:
  - Create the document with your reader in mind.
    - Should answer all questions on how to create the game.
Design Document Tips

- **Organization is very important.**
  - Break down your game into parts, and create a section for each part in your document.

- **Be both general and specific.**
  - Outline motivations as well as details.

- **A picture is worth a thousand words.**
  - Include diagrams, sketches, screenshots and/or storyboards.

- **Every design document is different.**
Example
Game Design
Presentation
Rocket Launcher

- Game starts with general game options:
  - Instructions & controls.
- Gameplay is broken down into the following stages:
  - Adjust rocket speed and angle.
  - Perform launch simulation.
  - Player can choose to replay or return to main menu.
Level Design

- Each level is made up of a starting planet (Earth), a highlighted target planet, and several intermediate planets.
- Players are given a chance to observe the planets’ movements before launching.
Gameplay Outline

- 10 levels total.
- When players click on “Launch”, the rocket takes off at the specified angle and speed.
- As the trajectory approaches the planets in the field, the movement is affected by the equation for universal gravitation:

\[ F_g = G \frac{m_1 m_2}{d^2} \]
Score breakdown

- Score is awarded as a sum of time and proximity factors:
  - Each 50 ms of travel time adds 1 point to the overall score.
  - Traveling within 1000 km of a planet increases score by 10 for every 50 ms spent close to planet.

- Level is cleared if target planet is reached, and score is over 100 points.
  - Stars are awarded for every 25 points above 100, to a maximum of three stars.