Penn State Shark Tank

Overview
Using Gamification concepts and theory, the team designed and developed a fun and educational game to help students learn specific concepts from the course IE 302: Engineering Economy. The sponsor, Dr. Jeya Chandra, professor of IE 302, provided the team with two different problems to address related to the course:
1. Inflation and how to convert constant dollars (without inflation) to actual dollars (with inflation)
2. Internal Rate of Return and how to compare multiple projects using the IRR and the MARR.

Objectives
The objective of this project is to apply gamification theories to build a game that will help students learn and better understand common problems in IE 302: Engineering Economics.

Approach
- The game scenario is inspired by the television show Shark Tank: the player (the student) is an investor being offered different products and must accept or reject them by calculating the product’s IRRs given the cash flows and then comparing that to their MARR.
- Sometimes the player is presented with one product and sometimes they are presented with two products to invest in one, both, or neither.
- There are also a couple types of questions where the player must calculate constant or actual dollar amounts given an initial value, number of years, and various rates.
- All numbers are randomly generated for every question so that the calculations vary each time.
- Products are randomly selected from a list of 30. Each product has an image, name, company, and description.
- There are only four questions in each round of the game, so players can play a couple rounds for quick practice or play many more rounds for longer study sessions.
- Penn State Shark Tank was developed in Java with the game framework LibGDX.
- The game has been deployed for desktop computers.

Outcomes
- The Shark Tank theme and other references to pop culture appeals to many students.
- A lot of calculations are involved, so players will become very familiar with which formulas to use for each situation by playing the game a lot.
- Random numbers and products adds replay value and keeps players on their toes since they may require different formulas or approaches to the same types of questions.