Haunted Decoder
Binary Conversion Game

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Story

- A well-developed story that establishes the plot characters, setting, and events.

- The game's narrative helps players feel engaged and more immersed in the game.

- The story takes place in the great country of Galldari that is broken into five districts. You play as Detective Rayleigh of District 5. He is on his way of solving a great mystery case of missing disappearances in area District 1. However, what he finds is something extraordinary that puts him great danger.

Abstract

We report on a serious game that assesses a player's ability to perform binary, octal and hexadecimal conversions. This is topic in computer science that is covered in several courses and is considered one of the fundamentals of computer design and architecture. The game, Haunted Decoder, was created using the Unity engine and C# code. Using the model of a 2D role playing game, many design patterns and tools are applied to facilitate a modern gaming experience.
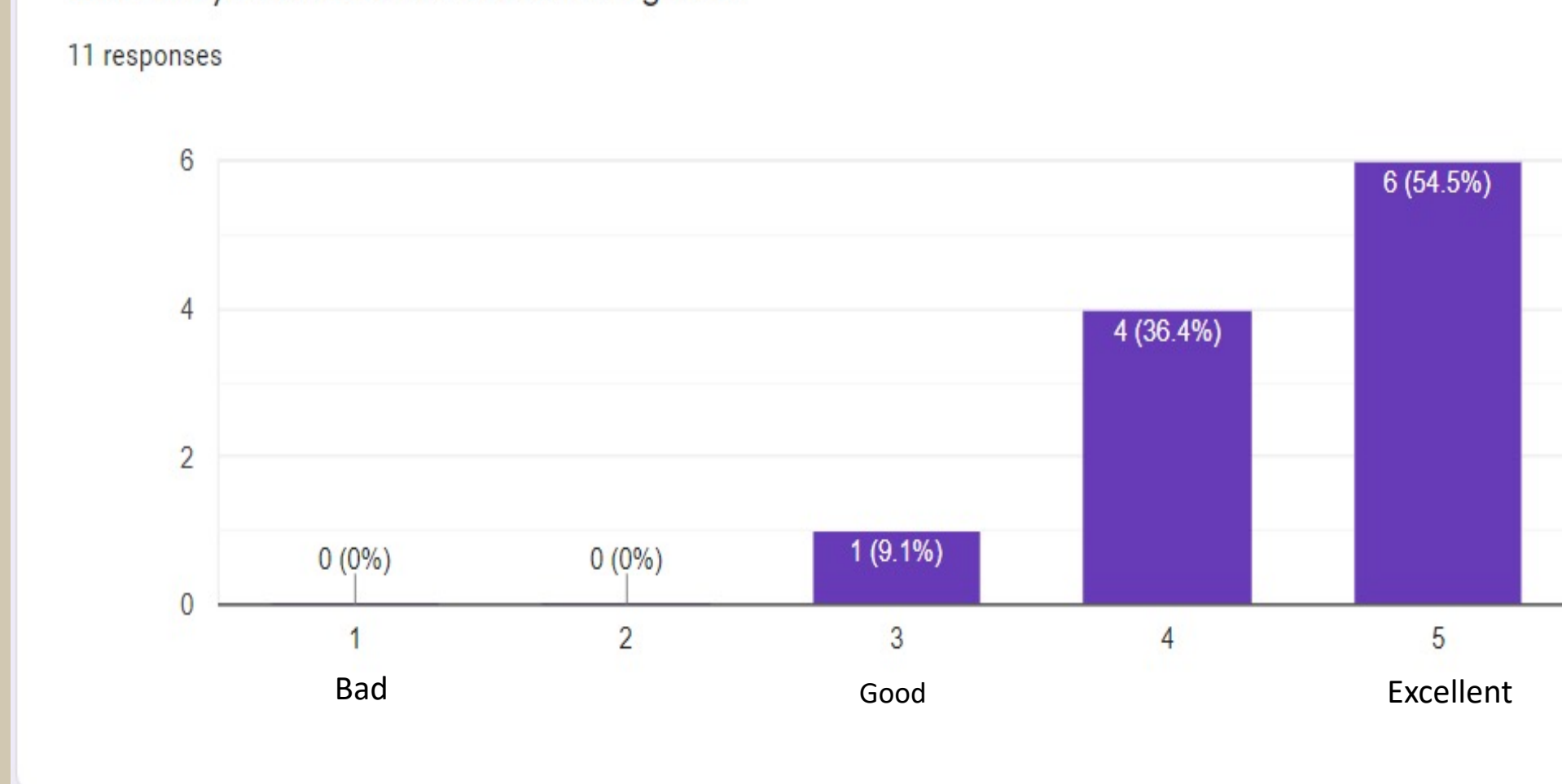
Student Feedback

A pilot study was conducted where students took a pre-survey, played the game and then took a post-survey (with feedback on the game experience). About 90% of players liked the gaming experience and about 70% had a better understanding of conversions after playing the game. Most CSC majors commented that it helped them refresh the material on binary conversions and some non-CSC majors reported learning and understanding the concepts.

" The cutscene in between going through the doors was very nice. The atmosphere and the music really fits the concept of the game. "

"I love the story and opening cutscene & animations. The achievements were a nice touch."

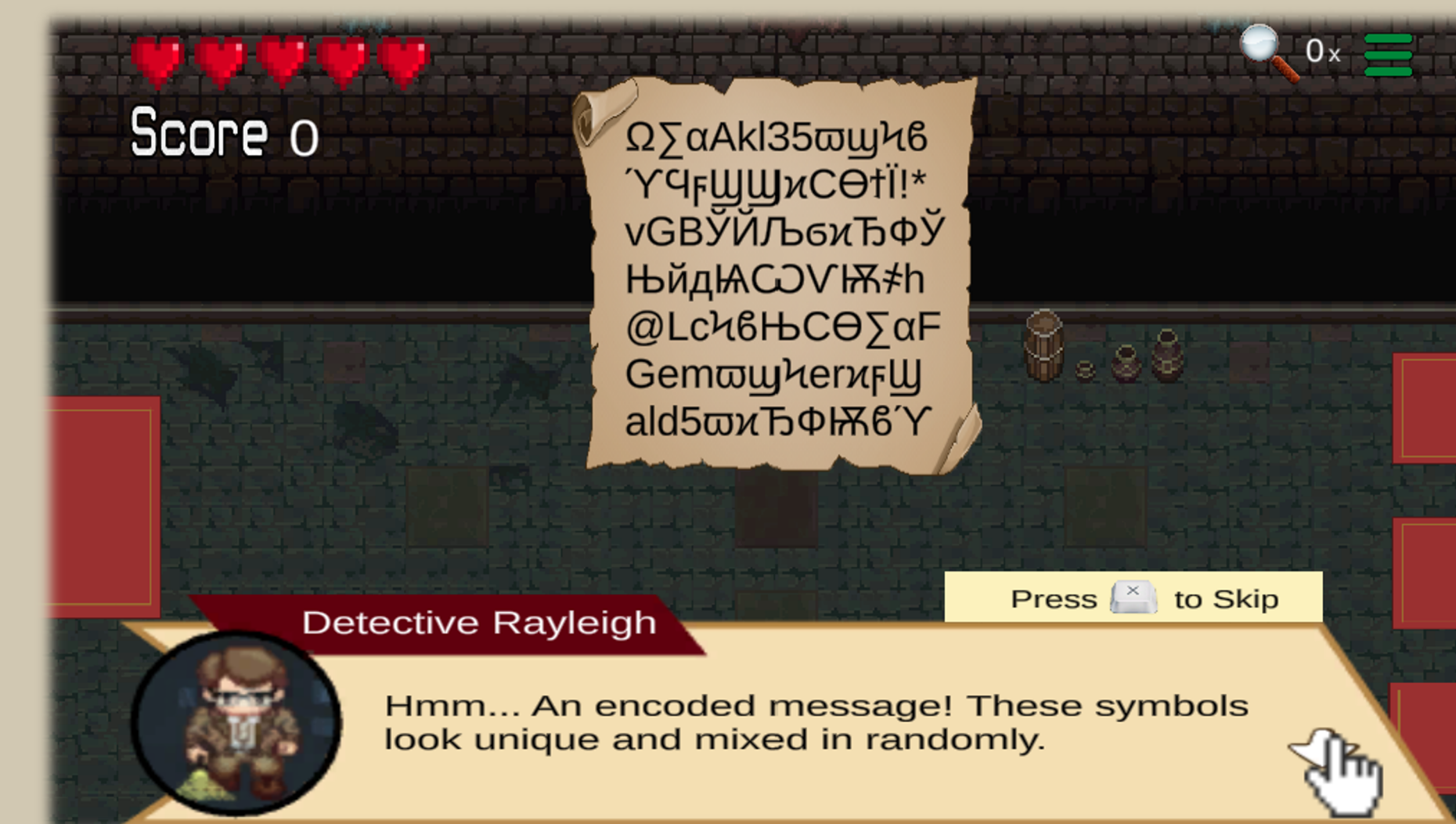What did you think of this educational game?
11 responses

Rating	Count
1 Bad	0 (0%)
2	0 (0%)
3	1 (9.1%)
4 Good	4 (36.4%)
5 Excellent	6 (54.5%)

Gameplay

- **Decoding Messages** Players unlock a chest that gives them an encoded scroll. In order to decode the message players must solve a binary conversion problem.

- **Riddles** Once the message has been decoding a riddle will display. This riddle hints upon choosing the right door to advance to the next level. If answered incorrectly you'll meet the haunted spirit in which you'll a lose life. However, If your lucky you may encounter a special item that gives you the ability to skip a riddle.

Score 0

Score 0

Detective Rayleigh
Hmm... An encoded message! These symbols look unique and mixed in randomly.
Press to Skip

User Experience

- The user interface and user experience was made for a seamless gaming experience.

- UI elements include the menu which displays the high score, game info, player achievements, and player information.

- The achievements UI is designed to show players the different achievements they have accomplished for each conversion types such as decimal, octal, and hex there is also game related achievements as well.

High Score
Score 1000
Time 0H:3M:25S
Exit
Help
Achievements

Decimal | Hex | Octal | Game
Complete 3 Octal Conversions
Complete 5 Octal Conversions
Complete 15 Octal Conversions

References

[1] Katrin Becker and JR Parker. 2007. Serious games+ computer science= serious CS. Journal of Computing Sciences in Colleges 23, 2 (2007), 40–46.
[2] Quincy Brown, Frank Lee, and Suzanne Alejandre. 2009. Emphasizing soft skills and team development in an educational digital game design course. In Proceedings of the 4th international Conference on Foundations of Digital Games. ACM, 240–247.
[3] "Check out What I Made." Code.org, studio.code.org/projects/applab/iukLbeDnzqgoxuu810unLw.
[4] "Cisco Learning Network." Cisco Learning Network, https://learningnetwork.cisco.com/s/binary-game.

Assessment Design

- The teaching process is integrated through an intuitive UI design.

- Players can learn the process of converting different conversions through an interactive UI. There are buttons that players can click which correspond to the values of a conversion type. They get feedback by a green lit tile which shows they got the right answer.

- As you progress through the game conversions get harder with a variety of different problems.

Input the Binary value
10001
To find the Hex value
8 4 2 1   8 4 2 1   Reset
0 0 0 1   0 0 0 1 = 11

In Octal conversions to and from Binary think about each number as a group of 3 binary values that would sum up to that number.
56
4 2 1   4 2 1
1 0 1   1 1 0