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Final Project Documentation

CS443 Mobile applications

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1. Project statement
   1. For this project, I developed a brick breaker game in which there is a paddle that is moved by the player, and a ball which is bounced off of the walls as well as the paddle. It is different compared to the normal brick breaker game in the sense that each time you break a brick, the ball is sped up by 10%. The game will end in either two ways. The first way is that you break all of the bricks. The second way is that you lose all of your lives and then the game will reset you back to the beginning. I wanted to develop this application because I felt it was a classic game that many would be able to understand but it had a twist to it. There are other versions of this game available however I do not think many have one where the ball speed will increase as each brick is broken. For this game, I specifically chose to have it be played in landscape so the user can have more space to move the paddle and the bricks would not be too condensed.
2. Application design
   1. For this application, I used four classes to make each part. I had one main class to contain everything and then I made a class for the ball, the bricks and the player. Each non-main class defined the specifics of its part. For example, the ball speed and the physics of the ball was defined in the ball class and then passed into the main class. Another example is the size of the paddle and its actions was defined in player and then passed into the main class. One of the main modules my app uses is android.graphics.RectF which was useful in drawing the bricks, paddle and ball. I also used java.util.random as well as paint and color to draw the background and color of the bricks, paddle and ball. This app is mainly designed for smartphones. I was not able to test this on tablets or other devices however using the emulator provided in android studio, I was able to develop and test this for an android phone.
3. Application Implementation and Evaluation
   1. In the application I defined classes BrickBreaker, Ball, Player, and Bricks. These classes all have their specific purposes and BrickBreaker is our main class. Ball controls the speed and size of the ball. Player controls the paddle and the movement of the paddle. Bricks controls the bricks and generation. Both Ball and Player class have a reset function in which when a player loses, the ball and paddle will be reset to their original spots. I tested the app numerous times by playing the game and attempting to test scenarios where the game would break. One of the bugs that I found was that the paddle had to be bound to the size of the screen. If it did not, the paddle would continue moving off screen and the game would not be playable. To resolve this, I set boundaries on how far the paddle could move. The paddle could move anywhere it wanted on screen but boundaries were set at the edges so the paddle could not move off. If it attempted to move off screen, the paddle would be reset to a position on screen. This was done for both left and right sides. Another error that was found during testing is that sometimes the ball does not behave correctly when bouncing on the sides of the screen. To fix this, I set special collision parameters on the sides of the screen to make sure that it would bounce back correctly. Lastly, I found that there were certain times where the collision of the ball and paddle were not detected. Originally I planned to use .intersects however I found that it did not work for my situation and instead I manually coded that if the ball hits the paddle which was defined in x-width and y-height then it would reverse its velocity and bounce in the opposite direction. Out of all of the bugs I found, I was able to solve the issues. After fixing each issue, more testing was done to make sure that it was functioning correctly.
4. Experiences and thoughts
   1. Overall, I felt that this project was a positive experience. I was able to explore a different part of android programming that used a variety of different modules that may have not been fully covered in class. If given more time, I would make the design of the app better. I felt that it was quite simple but it got the job done. Also if given more time, I would have liked to add a second game mode where you could play infinitely and try to obtain the highest score possible. I think given the amount of time however that this app is acceptable and developing it was a lot of fun. On the topic of the class, I thought this class was taught extremely well and everything that we had learned had prepared me for this assignment. At first it was difficult to get started however once learning the basics, the rest became much easier.