

# RiverRush: Entertainment for large groups

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## ABSTRACT

Waiting for a lecture to begin should be more fun. That is why we created **RiverRush**, a collaborative and competitive multiplayer game that takes on the challenge of entertaining a large audience in an auditorium. The game encourages people to work together as a team to beat other teams by using directional movement through their smartphone as input.

### Author Keywords

RiverRush; Auditorium Game; Collaborative Gaming; Competitive Gaming

### ACM Classification Keywords

D.0. Software: General

## THE PROBLEM

It is fairly common for large groups to attend an event or meeting in an auditorium. Usually those consist of a large amount of chairs pointed in one direction: Towards where the visitor's attention should be, such as the lecturer.

The problem we're trying to tackle is that there is almost always some time where the people in the auditorium have to wait for the event to start or during a break. During this time people are usually bored and decide to do something for themselves, like checking if they got any new messages. We want those people to have the opportunity for more engaging entertainment.

We have designed a game for this type of situation. Such a game comes with quite a bit of constraints however. Since the game is best suited for a large group of people in an auditorium, the game should support a lot of players at the same time. Even though there are many players, every player should still feel significant; that they feel like their participation matters. The game should be social; we want to encourage interaction between the people in the auditorium. A physical constraint is that the game should not require much space or intensive body movement, considering people are usually located in seats right next to each other. The last constraint is that the game should be easy to set up and allow easy dropping in and dropping out.

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## SOLUTION

### The idea

There are two boats in a river with animals on them. These two boats are competing in a race to the end of the river. On the way, obstacles come flying by that can knock the animals off the boat. In order to remain on the boat, the animals have to jump over the obstacles or avoid them. If an animal gets knocked off the boat it will take them a while to get back on it. The more animals there are on the boat at any given time the faster the boat goes, so the animals on the boat have to work together to be faster than the other boat.

You can see all this on the big screen in the auditorium. People can join the game by grabbing their smartphone and connecting to a URL. When someone joins the game they can choose which team they want to be in. After that, an animal that they can control will be added to that team's boat. They can now flick their phone up to jump or flick their phone left or right to move the boat in that direction.

It does not matter how many players have joined a boat, since the speed of the boat is determined by the amount of animals that are on the boat at any given time, relative to the amount of players that have joined that team.

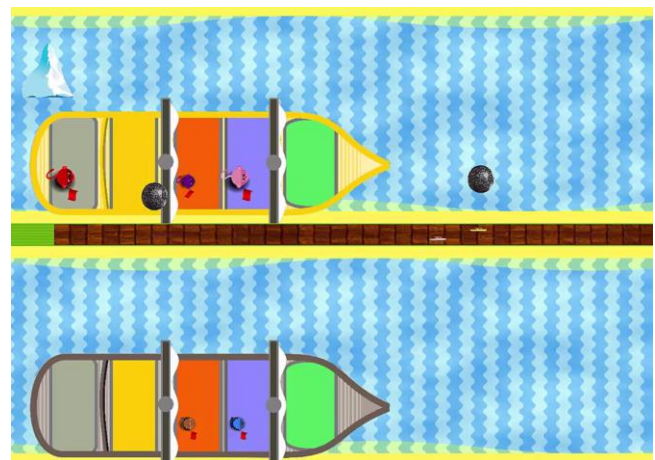


Figure 1. The Game Screen featuring jumping monkeys and various obstacles

There are different kinds of obstacles. There are cannonballs that players can simply jump over to avoid. There are also icebergs (these are less frequent). In order to avoid these, players have to move the boat to the side of the river by flicking their phone left or right. The more players flick their

phone a certain direction, the more the boat sails in that direction, so collaboration is key. If the boat collides with an iceberg, all players that did not flick their phone in the right direction will fall off the boat.

During the game, the teams can see how far they and the opposing team have progressed towards the finish. This way the teams know if they are ahead or behind the other team which will add to the competitive nature of the game.

Once one team reaches the finish, the game ends and can be restarted soon after.

### Implementation

We've implemented RiverRush according to the idea described above. We've split up the game into three components.

First we have the server side, written in java, which processes the game logic and uses (web) sockets to interact with the other two components.

The second component is the renderer, also written in java, which receives information from the server through a socket and uses that information to draw the game to the screen using the LibGDX library.

The last component is the web app, which is written in HTML5. This is a web page users can load on their smartphone which allows them to interact with the game (specifically the server). We've chosen to write a HTML5 webpage over writing a native app because we want to make it easy for people in an auditorium to join the game. We chose this approach as we believe requiring people to download an app makes them less inclined to join. Another advantage of HTML5 is that it works cross-device. Using a HTML5 page also has some drawbacks of course. For example, accelerometer support is more limited in comparison to a native app and if people have set their phone to automatically rotate their screen might unintentionally rotate through their gameplay. However, despite of the drawbacks of a HTML5 webpage, we found that the advantages outweigh the disadvantages.

### Why it works

Our game is a good solution to the problem because our game is collaborative, competitive and individual. It's collaborative because the players in a team have to work together to do well, it's competitive because two teams play against each other, and it's individual because everybody is in control of their own animal on the boat.

Since almost everybody has a smartphone nowadays, almost everybody is able to join the game. The intuitive controls are easy to understand and pick up for everyone, and they can join and leave the game any time they want.

### Limitations

Our game also has some limitations. To run our game, you'll need a computer to run the game and a beamer or big screen in the auditorium that is linked to this computer, to project the main game screen on. You also require a webserver to host the HTML5 client that players can connect to. Naturally,

every player that wants to play needs to have a smartphone or some other device with a 'modern' web browser. Up to 100 players can play simultaneously, after that amount has been reached new players will be rejected.

### CONCLUSION

Our game is a unique experience because it allows an unusually large group of people to play a game simultaneously that's both competitive and collaborative, while still making the player feel like their participation is of importance. The low barrier of entrance in terms of hardware requirements (a smartphone or any other device that carries a web browser), the dynamic approach to joining the game (drop in drop out system), the flat learning curve, and intuitive motion controls make it attractive for any attendee

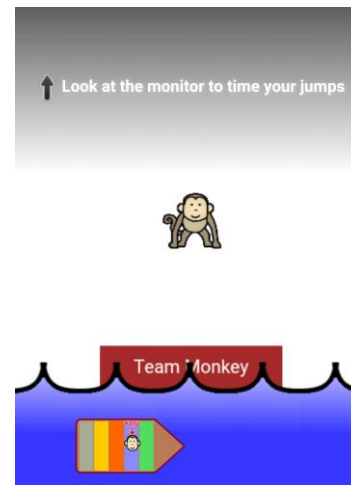


Figure 2. Jumping on the Web App Client

to join the game which creates an energetic environment for people to be entertained during their downtime.

### ACKNOWLEDGMENTS

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### REFERENCES

1. Maister, D. H. *The Psychology of Waiting*. Retrieved from Columbia.edu: [http://www.columbia.edu/~ww2040/4615S13/Psychology\\_of\\_Waiting\\_Lines.pdf](http://www.columbia.edu/~ww2040/4615S13/Psychology_of_Waiting_Lines.pdf), (2003)
2. Monique, G. S. & Yonge, O. 'We're it', 'We're a team', 'We're family' means a sense of belonging. Retrieved from rrh.org.au: <http://www.rrh.org.au/Articles/subviewnew.asp?ArticleID=1021>, (2008, May 25)
3. Sieber, J., McCallum, S., & Wyvill, G. *BallBouncer: Interactive Games for Theater Audiences*. Retrieved from bibsys: <http://brage.bibsys.no/xmlui/bitstream/handle/11250/134763/1/sieber-mccallumwyvill.pdf>, (2008, December 8)