Frogger

Group 1

17 November 2014

One fine morning. . .

Introduction

In this project, we have tried to create a frogger game of our own using C programming and various concepts of probability which we have learned and understood in this semester. In this presentation, we will have a look at the concepts used and then we will go for a spin with our very own created frogger.

Acknowledgement

We would like to thank our professor, Dr. Pratik Shah, for giving us this project which has led us to appreciate the role and use of probability in the field of Game Development and Computer Science.

- Random Variable
  - Bernoulli Random Variable
  - Geometric Random Variable
- Generation of Geometric Random Variable
- Random Processes
- Sneak peek on Frogger
- Our Version of Frogger

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Random Variable

Random Variables

Random Variable is a function which maps outcome of an event to a number. In other words, it is a quantity that depends on chance.

Domain of Random Variable is the sample space. It's range can be the set of all real numbers.

Example (Tossing of 3 fair coins)

Let X be a random variable which counts the number of heads. Here, X maps Heads which is an element of the sample space { Heads,Tails } to a number either 0,1,2 or 3.

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Bernoulli Random Variable

Bernoulli Random Variables

A random variable with two possible values either 0 or 1, either success or failure is called a Bernoulli random variable. Any random experiment with binary outcome is called a Bernoulli Trial.

Example (Tossing of a fair coin)

This is a Bernoulli trial. Let 'p' be the probabality of success, where success is to get heads. Therefore, probability of failure would be 1−p.

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Geometric Random Variable

Geometric Random Variables

It is a random variable which keeps the track of the number of Bernoulli Trials needed to get first success. It's distribution is called **Geometric Distribution**.

Example

A search engine goes through a list of sites looking for a given key phrase. Suppose the search terminates as soon as the key phrase is found. The number of sites visited is geometric.

Example

A hiring manager interviews candidates, one by one, to fill a vacancy. The number of candidates interviewed until one candidate receives an offer has Geometric distribution.

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Generation of Geometric Random Variable

Example

A while−loop of Bernoulli trials will generate a Geometric random variable, literarily according to its definition. We run the loop of trials until the first success occurs. Variable X counts the number of variables.

X = 1; \ \Need at least one trial
while rand > p \ \Continue while there are failures
X = X + 1;
end;
X

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Random processes

Random Processes

It is a random variable which depends on time. Just as a random variable assigns a number to each outcome s in a sample space S, a random process assigns a sample function $x(t,s)$ to each outcome s. Random Processes are also known as Stochastic Processes.

Counting Processes

As the name suggests, these are the random processes which count. A stochastic process X is **counting** if $X(t)$ is the number of items counted by the time t.

Binomial Processes

Binomial process X (n) is the number of successes in the first n independent Bernoulli trials, where n = 0, 1, 2,. . . . . .

Random Processes

Inter-Arrival Time

It is the time between two consecutive successes.
The distribution of this random variable is Geometric. We are generating the traffic in our game using this random variable.

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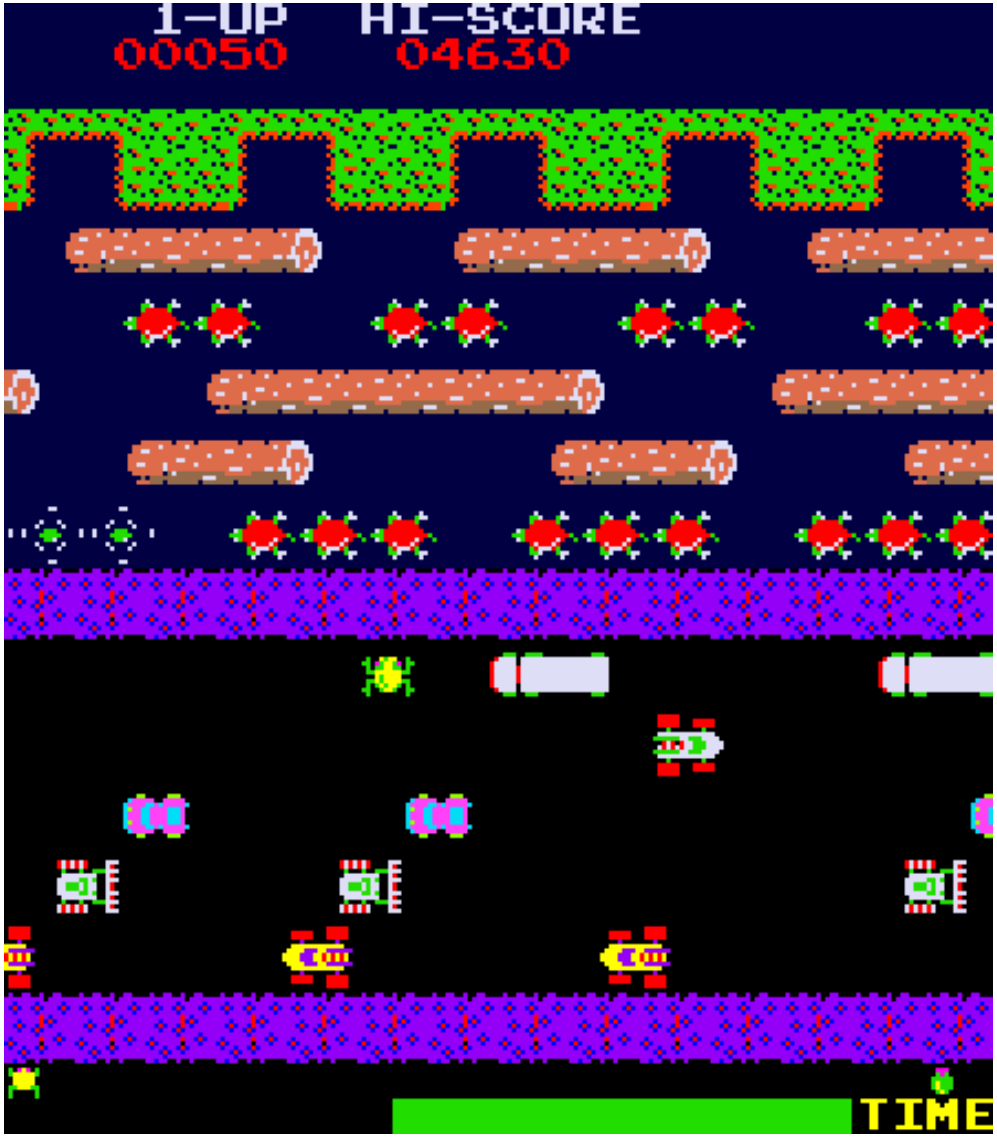
Sneek Peek on Frogger

- Frogger is an arcade game whose object is to direct frogs to their homes one by one. To do this, each frog must avoid cars while crossing a busy road and navigate a river full of hazards.
- The player starts with three, five, or seven frogs (lives).
- The player guides a frog which starts at the bottom of the screen. The lower half of the screen contains a road with motor vehicles speeding along it horizontally.
- The upper half of the screen consists of a river with logs, alligators, and turtles, all moving horizontally across the screen. The very top of the screen contains five "frog homes" which are the destinations for each frog.
- Every level is timed; the player must act quickly to finish each level before the time expires.

Sneak Peek on Frogger

Screenshot of Frogger



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Our version of Frogger

- We use W,S,A,D keys to move the frog(in our case, cursor) Up, Down, Left and Right.
- The screenshots expain the game.

Our Version of Frogger

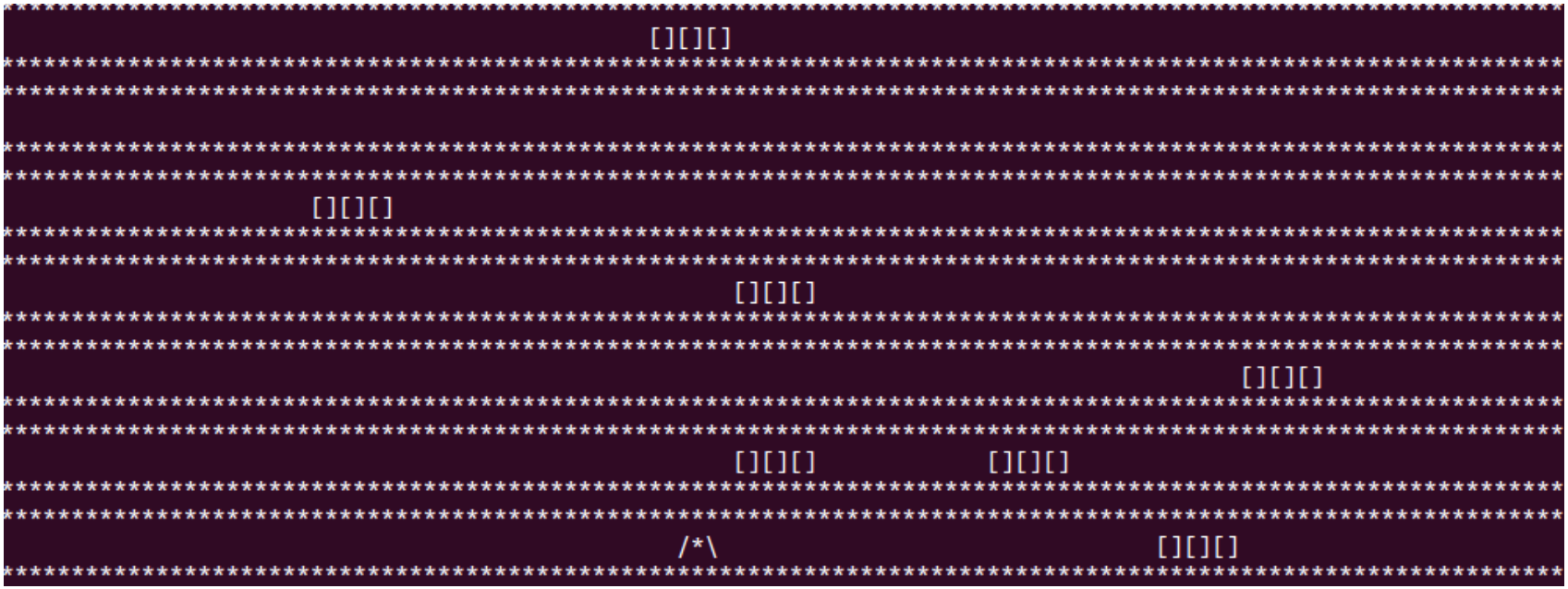

Figure : Starting of the game

Our Version of Frogger

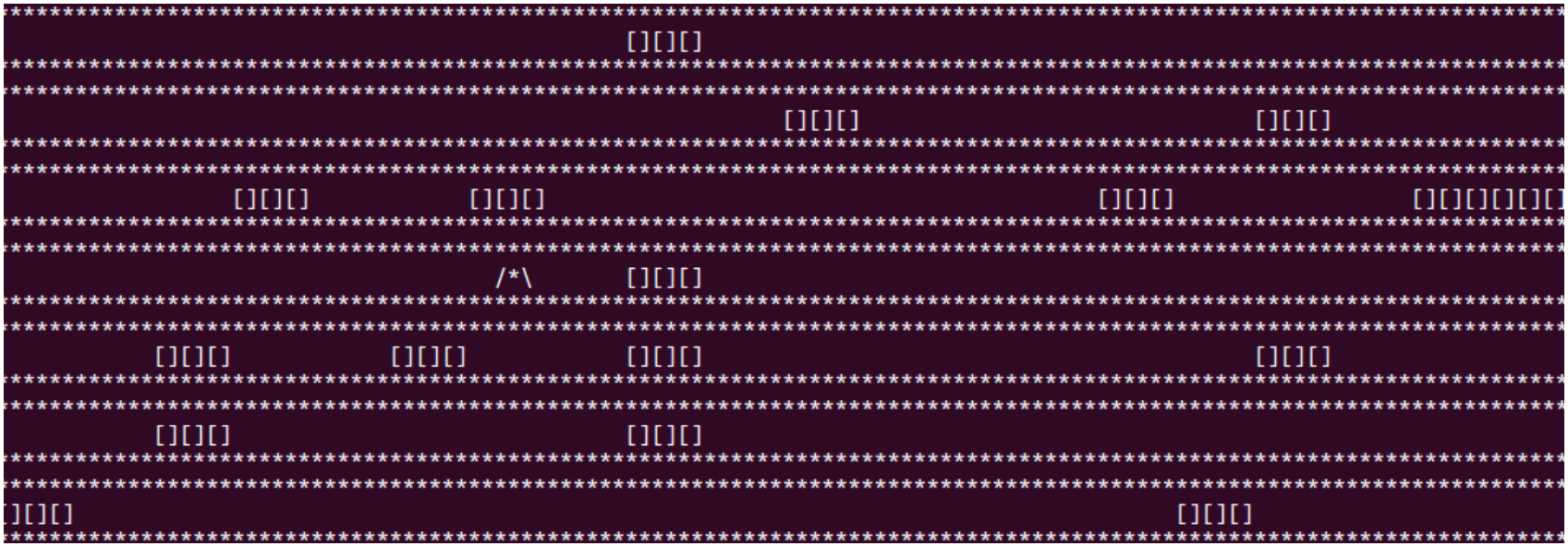

Figure : Intermediate position in the game

Our Version of Frogger

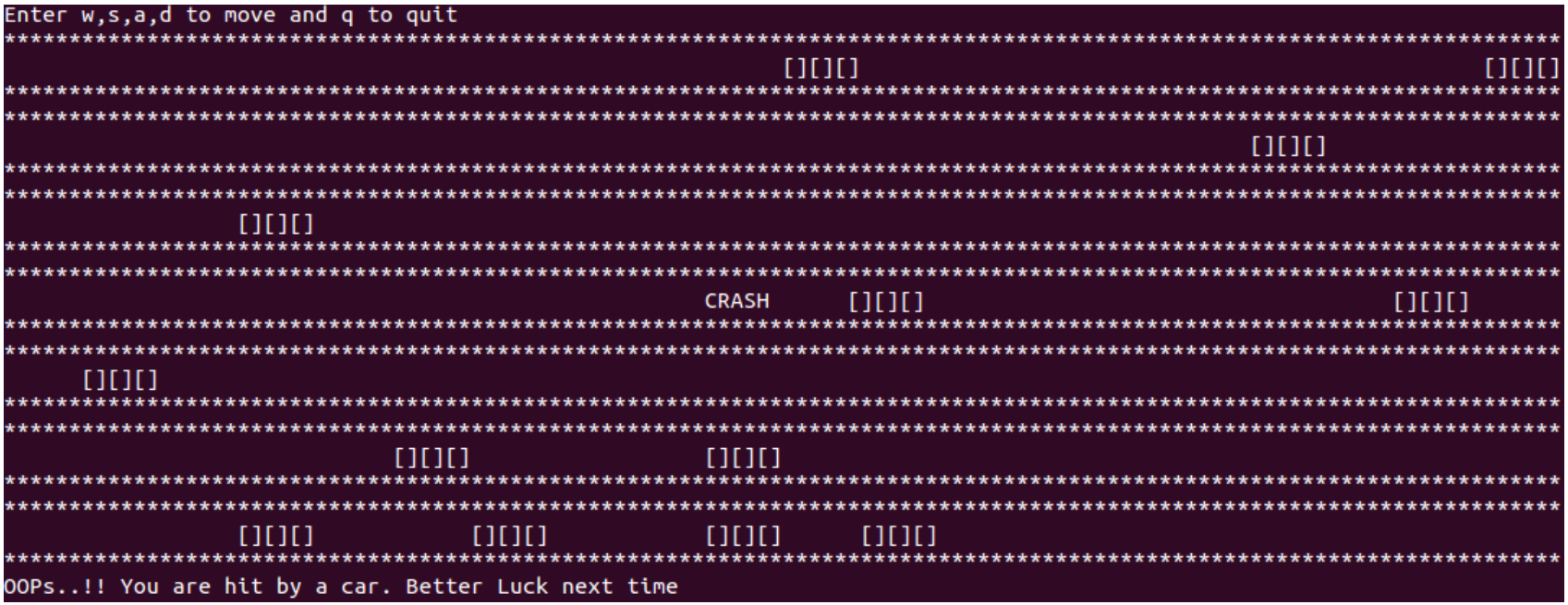

Figure : If we are Hit

Our Version of Frogger

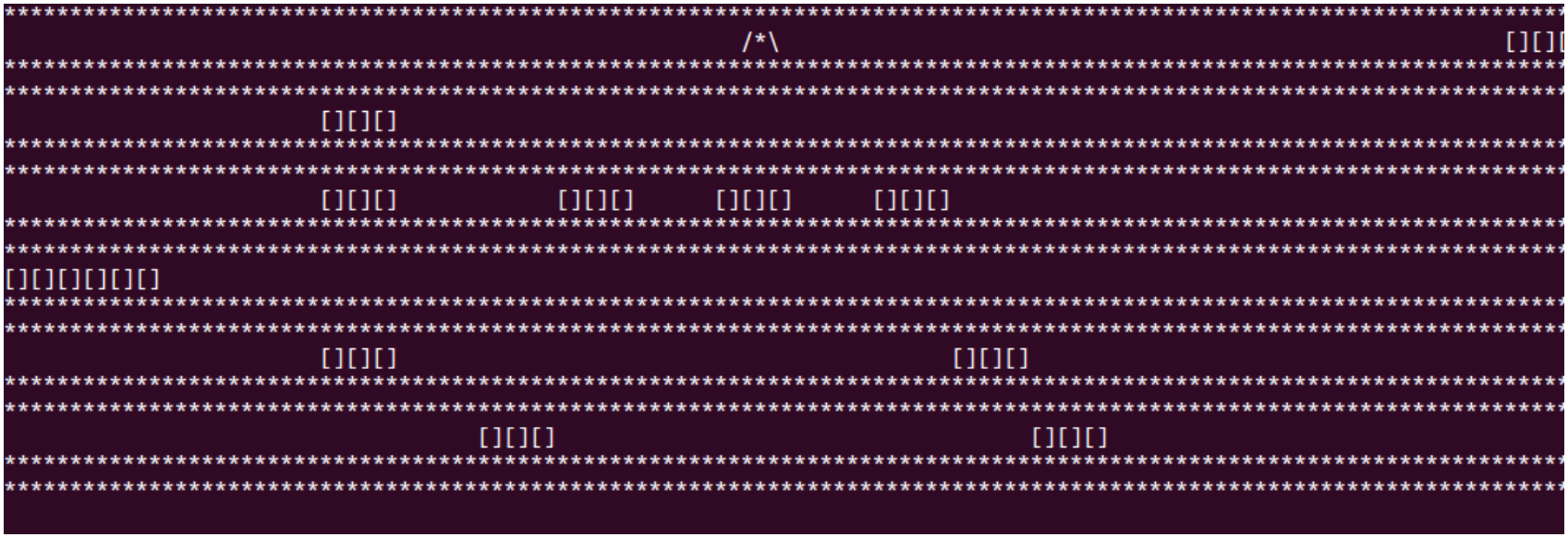

Figure : Final goal

Our Version of Frogger

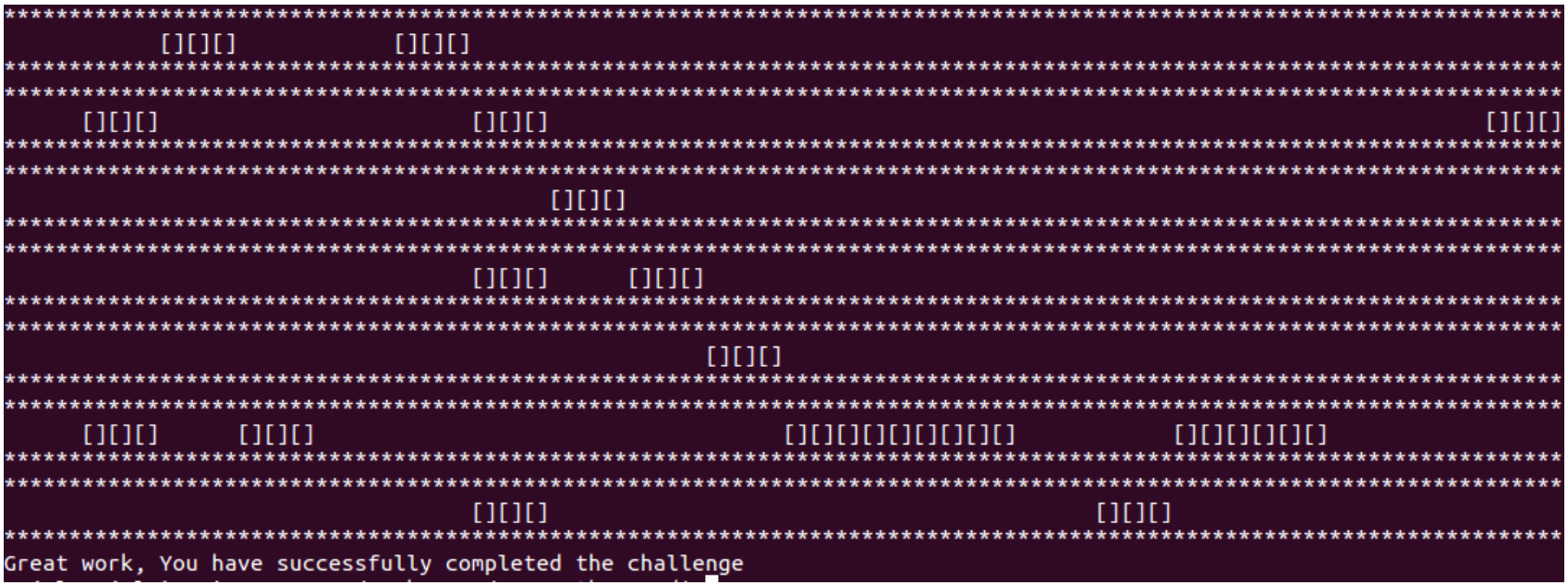

Figure : And Bravo! Challenge Completed

Our Version of Frogger

Time for some Real Action

Let's do some frogging!!!

Developers

Our Dream Team of Developers
Presentation

- Rounak Jangir
- Shambhavi Jha
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Material Collection & Design

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- Manu Sharma
- Prashant Verma
- Ajay Shewale

Coding

- Anjul Kumar Tyagi
- Shubham Sharma
- Gaurav Yadav
- Aditya Prakash

References

- Probability and Statistics for Computer Scientists *by Michael Baron*
- Beginning Linux Programming *by Neil Mathews, Richard Stone*
- Introduction to Probablity *by Dimitri P. Bertsekas, John N. Tsitsiklis*

Thank You