

# CSE 4361: SOFTWARE DESIGN PATTERNS

November 9, 2021

## Homework 7, 20%

Due: 11:59PM 11/30/2021

### 1 Introduction

This individual homework requires the student to perform analysis and design for the Monkey and Banana game. When the application is launched, a window is displayed with two buttons and a square area called the yard. The two buttons are labeled “Start” and “Stop,” which the user can click to begin and end the game. The yard is the monkey’s wonderland, which is conceptually divided into 10 by 10 small squares.

When the game is started, a monkey and a single banana are randomly placed at two separate locations in the yard. The goal of the game is to move the monkey to get the banana. That is, the user presses the keyboard ←, →, ↑ and ↓ keys to move the monkey left, right, up and down, respectively. One press moves the monkey one square in the direction of the arrow key pressed. When the monkey gets the banana, it consumes the banana immediately. At the same time, a new banana is placed at another randomly determined location. These are repeated until the game is over, or the user clicks the Stop button.

The game has the following rules:

1. The monkey can move horizontally or vertically. This is controlled by the up, down, left and right keys of the keyboard. These keys can be pressed or clicked to advance the monkey continuously or one step at a time. The monkey moves from one small square to another.
2. The monkey needs time to move from one small square to another. Hint: you may use a timer or let the program sleep a number of milliseconds.
3. The monkey must get the banana within a preset period of time, measured from the occurrence of the banana. If the monkey does not get the banana within this time period, the banana is placed at another randomly determined location, and the time is recounted.
4. The game is over when a user-preset play time has elapsed. When this happens, the total score is displayed.

In above, all time variables except the play time are set by the game developer — that is, by the student of this homework assignment.

### 2 What Needs to be Done?

This homework requires the student to do the following:

1. Construct a state diagram to describe the behavior of the monkey. (35%)
2. Apply the state pattern to produce a design class diagram (DCD) showing the classes and their methods. The DCD must also include all other classes, methods and relationships needed to play the game. (35%)
3. Implement the game in Java. (20%)
4. Compile and run the game. Produce three screen shots showing the movement of the monkey. (10%)

### 3 What to Submit

Submit a .zip or .rar file containing the following:

1. The state diagram.
2. The Design class diagram.
3. Java code that implements the game.
4. Screen shots showing the movement of the monkey.

### 4 How to Submit

Name your file as follows, fail to do so may result in deduction of points:

CSE5322\_202\_F21\_HW7\_Lastname\_Firstname.zip, or  
CSE5322\_202\_F21\_HW7\_Lastname\_Firstname.rar

Additional submission instruction will be given by the TA before the deadline. You can submit early and resubmit before the deadline. A late submission within one week period will be accepted but it will subject to 10% deduction. Submissions that are late more than one week will not be accepted.