

# Design Document

## Brian Koga

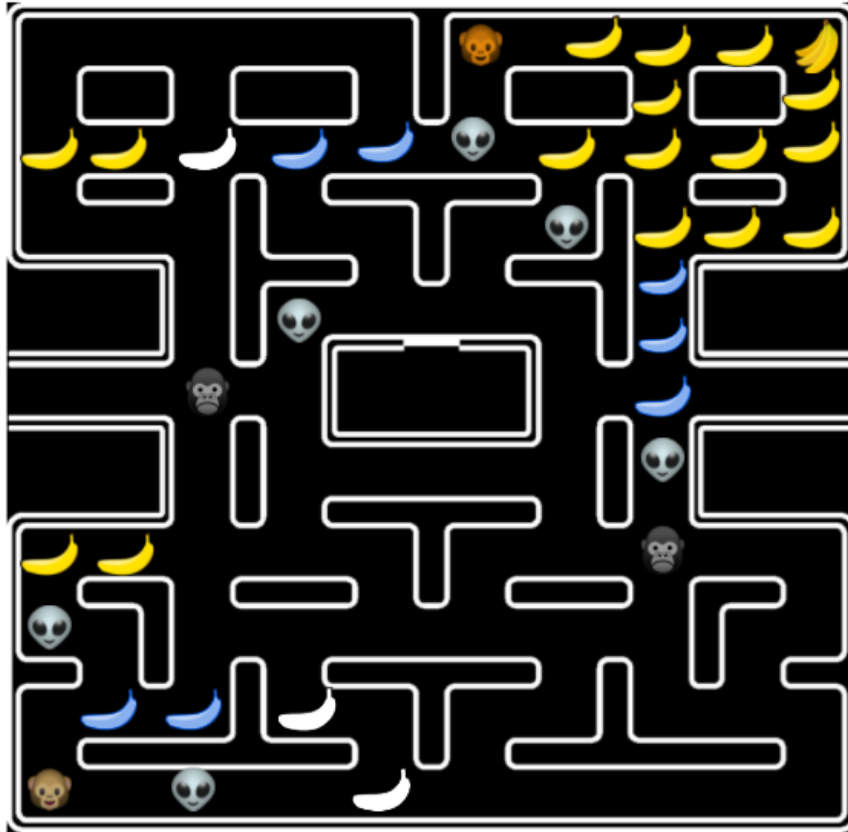
### **Basic Idea**

For the most part, my game is a Pac-Man clone. The player controls a character that travels around a maze collecting something, while being pursued by enemies. It is aesthetically different from Pac-Man because I've decided to have the player control a monkey that is collecting bananas, while being chased by aliens. However, the main difference from Pac-Man that I'm hoping to implement, is to have the player simultaneously control two different monkeys. These monkeys will both be pursued by aliens and they can both collect bananas, but there will be some bananas that can only be collected by one of the monkeys. Another difference from Pac-Man that I am hoping to implement is that instead of eating power dots that allow the player to chase the enemies, if a monkey collects a large bunch of bananas, some gorillas are spawned in that chase the aliens away from the monkeys. Like Pac-Man, a level will end when all of the bananas have been collected, and if the player no longer has any lives, the game is over.

The player only loses a life if both monkeys are dead at the same time. If one of the monkeys has been caught, the plan at the moment is that it can be freed if the other monkey walks over the place where it was caught. However, if it turns out that is too hard to do, then I will probably have the second monkey respawn after a certain amount of time if the solo monkey managed to survive.

### **UI**

The UI will end up looking a lot like Pac-Man. The maze will be displayed, and the monkeys/aliens will be somewhere in the maze, as will the bananas that need to be collected (see mock-up image below). There will also be some extra information outside the maze, such as a score and life counter. If there is time, I would like the maze not to simply be black and white or something with neon walls, but perhaps something that fits the theme more such as a jungle aesthetic.



## Entities

The main classes of entities will be bananas, monkeys, aliens and gorillas. The bananas will be static and spawned at specific points at the beginning of the level. They will have a color associated with them that will indicate which monkey can pick them up. Aliens and gorillas can walk over the bananas without anything happening, but if a monkey that is able to pick a banana up walks over it, the banana will disappear and the score will be adjusted.

The monkeys will be player controlled, and will move around the maze. If they pass over bananas that they can pick up they will be collected, otherwise, nothing happens.

The aliens are AI controlled entities that chase the monkeys. At the moment, the plan is to have them use Dijkstra's algorithm to pathfind to the monkeys. If they manage to catch the monkeys, they will put them in cages where they were caught. If both monkeys are in a cage at the same time, the player loses a life.

The gorillas are AI controlled entities that chase the aliens for a certain amount of time. The plan is to use Dijkstra's to pathfind to the aliens. If the gorillas catch the aliens, they put them in cages, where they remain for some amount of time (either until the gorillas despawn, or perhaps even longer).

## Sticking Points

There are a few difficulties that I see with this game, though most are related to the features I'd like to add that aren't in Pac-Man. The first one is the behavior of the gorillas and aliens when the gorillas are on the board. Ideally, the gorillas would intelligently chase the aliens with the goal of capturing them, while the aliens would intelligently flee the gorillas without accidentally running into another one. The contingency plan for this would be to have the gorilla identify the closest alien when it spawns, and chase that one until it is caught, or until the gorilla despawns.

The main sticking point is implementing how the aliens decide which monkey to chase. Ideally, the aliens would be mostly homogenous and could all chase either monkey. But I see some potential problems resulting from that, including having one monkey being chased by most of the aliens, or having an alien that ends up moving back and forth between a few tiles while it constantly switches between which monkey it is chasing. If it is too hard to implement this, then the fallback will be to have dedicated aliens that only pursue one of the monkeys (but can still capture the other monkey if the player is foolish enough to enter the same tile).

## High Bar Items

Some of the high bar items are mentioned above, but I will list them all here.

Two Monkeys: I'm including it here, but since this is the main difference from Pac-Man I'd like to implement, this is more of a "mid-bar" item. However, it is possible that this will be hard to implement or hard to play.

Intelligent Gorillas: Having gorillas that make player-like decisions on which alien to chase, and possibly coordinate with other gorillas to capture the aliens. I think that the difficulty here will be directly related to how intelligent I want them to be.

Homogenous Aliens: Have all of the aliens be the same and able to chase either monkey. They will intelligently decide which monkey to pursue, and will change targets if it "makes sense". This may end up being easier than I think it is, but will at least require a lot of testing around what to do if the monkeys are the same distance away, switching targets, etc.

Solo Monkey: What happens when one monkey is captured. Ideally, the remaining monkey is pursued by all of the aliens until the other monkey is freed by walking over the tile that it is captured in.

Other Powerups: It would be nice if there were special bananas that did things other than summon gorillas. Maybe some sort of banana magnet or alien shield. Maybe something that triggers an XCOM team that comes and kills the aliens.

## Low Bar Checklist

Obstacle-Filled World With Collectibles: There exists a maze-like world with walls, corners and junctions, that is filled with bananas for the player to collect. The bananas despawn when collected, and the level ends when all of the bananas are collected.

Player Controlled Entity: There is a monkey that the player controls that moves through the maze collecting bananas. The movement and corner turning is relatively smooth and responsive to input.

AI Entities Pursuing Player: There are several computer controlled aliens that chase the player using reasonable pathfinding. The movement of these entities are also smooth and consistent with what you expect from a pursuer.

Special Item (bunch of bananas): There are several bunches of bananas spread throughout the maze that spawn in gorillas when collected. These gorillas chase the aliens until their timer runs out and they despawn.

State-Changed Enemies: When there are gorillas on the board, the aliens change their objective from pursuing the player, to running away from the gorillas.

This low bar checklist is very comparable to Pac-Man since it is essentially just Pac-Man. The behavior after collecting a bunch of bananas is different from a power dot, but other than that it is simply a Pac-Man clone. This was done deliberately and I am hoping to add most of my high bar items, particularly having the player control two monkeys, because I think that is the most interesting part of my game idea.