# Game of Falling Objects

Note: We will use the example of “falling coins” in this document.

## Description

In this game gold coins fall from the sky and you are expected to catch as many as possible by using a “catching” object such as a vessel. When the timer expires you win or lose depending on the percentage of your catch w.r.t. the total that fell.

## How to run the program:

1. Click on the “Green flag”: everything is reset to original state.
2. Set coin speed using the slider.
3. Press SPACE BAR to start the game.

## Scratch concepts used:

### Basic version

* Motion
* Looping (simple)
* Conditional looping
* Random
* Variables (simple)
* Sensing
* Conditionals (IF, Wait until)
* STOP commands
* User interaction

### Advanced version:

* Clones

## Program Versions:

Coins-1.sb2: includes step 1 below.

Coins-2.sb2: includes step 2 below.

Coins-3.sb2: includes step 3 below.

Coins -adv.sb2: includes the advanced features listed below.

## Design Steps – Basic Version:

### Step 1:

Get a “coin” sprite and make it fall randomly from the sky, i.e. from the top edge of the screen. First, make it fall repeatedly from the same location. This can be achieved in three ways:

1. Using Glide:

Go to a point on the top edge, say x=100, y=180

Show

Glide to x=xposition, y=-180

Hide

1. Using Change y (or point downwards and move):

Go to a point on the top edge, say x=100, y=180

Show

Repeat 360/5

Change y by -5

End-repeat

Hide

1. Using repeat until

Go to a point on the top edge, say x=100, y=180

Show

Repeat until yposition < -180

Change y by -5

End-repeat

Hide

Next, make the coin appear at random points on the top edge. This can be done by using random inside the Go to command. You can also include a random amount of wait before every fall.

### Step 2:

Next, add the “catcher” sprite. It should move left-right only and follow the mouse pointer. Make the coin disappear if it touches the catcher.

### Step 3:

Next, add the timer. The stage can count time by using a variable. It can count down in two ways as shown below:

1. Using repeat:

Set Time=25

Repeat 25

Wait 1

Time = Time - 1

End-repeat

1. Using repeat-until:

Set time=25

Repeat until time < 1

Wait 1

Time = Time - 1

End-repeat

All the “forever” loops of other sprites can monitor the state of the timer through another variable called “time up” (which will be NO initially and YES when the timer expires). Also change the background when time is up.

### Step 4

Give the final touches. Add variables “collection” to track how many coins were caught and “total” to track how many coins fell from the sky.

Show the instruction page when green flag is clicked and hide everything else at that time.

Add background music if desired.

## Design Steps – Advanced Version:

We can make several improvements in the basic version as listed below.

### Clones for coins:

It is tedious to use multiple sprites for coins since any change requires a lot of duplication of work. With clones, we just use one coin sprite.

Algorithm:

Parent:

Forever

If time is not up

Create clone

Wait random time

End-if

End-forever

Clone:

Go to a random point on the top edge

Fall down while checking if touching the catcher

Delete clone

### Speed:

Add a slider variable called “speed” which can control the speed of the falling coins.