# Project #1: Making a Scratch Pong Game (10 points)

What is Pong?

Pong was one of the first computer games ever made popular. It is a simple table tennis-like game where a pair of paddles (rectangles) are moved up and down on opposite sides of the court (screen) to deflect a moving ball. The game can be played between two people or against the computer, we will start with the first version, but feel free to enhance it further. If you are not familiar, do a search online or go to (www.ponggame.org)
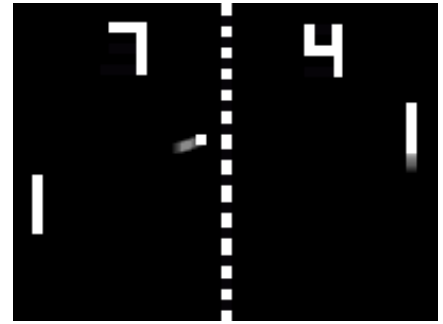
Before you start: First make sure you have completed your "Scratch Conditionals" worksheet. On the back page you should have created the necessary script to have a cat Sprite bouncing between two rectangle sprites by pointing it in the opposite 90 degree angle when they touch. If you have not, work on the assignment, ask for help, and complete it. Make sure to turn in your for grading.

Atari's home Pong game, 1975

A. The Basic Game:

You should now have a ball bouncing back and forth between two paddles. First get a simple game in which two players can each control a paddle (the rectangles) and the ball goes back and forth, bouncing at an angle. We will add more to this game over the next few days. I encourage you to try to complete the game on your own but if you bet stuck, try the instructions below.

1. Ball: First, change the cat Sprite to a smaller image, perhaps a ball or something more round.
2. Paddles: Adjust the size of your two rectangles to become the left and right "paddles". Position them nicely at the opposite sides of the screen.
3. Controlling the Paddles: Add scripts for these two paddles move up and down. Use 'when __ key pressed' and 'change y by __'. You will need to have two different set of keys control each panel.
4. Initialization: When the game starts (green flag), make the ball starts in the center of the screen (like you did when making loop shapes) and then point it in a random direction. You can use 'point in direction __' and a random number between 0 and 360.

point in direction (pick random ① to 360)

5. Bouncing off the walls: Make the ball bounce when it hits an edge by using the 'if on edge, bounce' block.
6. Bouncing off Paddles: When the ball hits a paddle, it should turn to face the opposite way it came. To do this, you will need to add 180 degrees to the current direction. Use the current direction in the Motion section and addition in the "Operators" section.

point in direction (180 + direction)

With these simple updates you should have the paddles under control of the keyboard and the ball bouncing off of paddles and the walls. Try it out, how fun is this version? Think about what you will need to make it more complete and way more fun. (more on next page…)

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B. Adding Fun to the Game:
After getting the basic game working we will make the game more interesting! Notice, that it's not very fun yet -- you always know exactly where the ball is going to go. How could you make it more interesting?:

- Background: Create an interesting background, but make sure that the colors don't conflict with bouncing off the paddles. In fact, what could you change so that the ball does not rely on colors to bounce off the paddles??
- Random Bounce: Add a slight random turn when the ball bounces off a paddle. For example, add to the "180 + direction" a random number of degrees between 0 and 10, or maybe -10 and 10? See what appears to work best.
- Sound (optional): find places to add sounds. When the ball hits a paddle? When you start? When you score…

C. Finishing up the Game:
(We will have a lecture to cover Using Variables & Broadcast Events soon that will help…)

- Add the Scores: Create the left and right (or name them by color) score variables. Position them nicely to display on the screen during play; decide how best to display them.
- Scoring: To trigger scoring, place a thin colored bar (or new sprite) on each side of the field to act as the two goals. When the ball hits either goal, add a point to the opposite side's score, and make sure to restart the ball back in the middle. Try it out and make sure everything works smoothly.
- Speeding up the ball (optional): How can you make the game speed up over time? Try creating using a variable to control the move amount, and add 1 every time a point is scored. Experiment with the values and see what works best for game play.
- Winning: Pick the winning score value (suggestion 5). When either player reaches the winning score, then "broadcast" a message to do these things:
  - Display the winning message so we know who won.
  - Stop the ball so it no longer moves around the screen, in fact you can stop all action.
- Original: Feel free to add other things to make your Pong game your own and more creative, but make sure that your game still meets all the requirements of its Rubric.

Before your turn in your Pong Project, make sure that it meets all the requirements of the Rubric. Remember: **Your Scratch program must be all YOUR own work, do not copy or use others' code – that will be considered cheating.** Do not show each other directly how to solve problems, but feel free to talk about them. When in doubt ask your teacher

Turning in your Project: When ready, make a copy of your Pong Game in our class folder: **My Computer > S: > embergquist > Writeable > IntroCS > Class Period 1 or 3 >** Add your name to the title of your Scratch program so I know it is yours; example: Tom-Pong

I hope you have fun creating this first project. Let me know if any of the instructions above could be clearer. Some are left vague enough to allow you to explore Scratch and find the correct commands to use. As always ask questions in class if needed
As always, a big thanks to Ms. Martin who created the original Pong project that this one was based on.

Images care of http://commons.wikimedia.org/ : Pong bs.png & TeleGames-Atari-Pong.jpg
Introduction to Computer Science, Garfield HS, Mr. Bergquist, September 2013