

The background is a dark blue maze with light blue walls. A Pac-Man character is positioned at the top left, and several ghosts are scattered throughout the maze. The text is centered over the maze.

HOW TO CREATE YOUR OWN PAC-MAN GAME

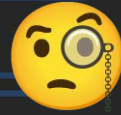
WITH

SCRATCH

TODAY WE WILL LEARN...

- HOW TO PROGRAM IN SCRATCH
- BASIC PROGRAMMING CONCEPTS
- HOW TO CREATE THE PAC-MAN GAME IN SCRATCH

WHAT IS SCRATCH?!



- EDUCATIONAL TOOL
- BLOCK-BASED VISUAL PROGRAMMING LANGUAGE
- YOU CAN PROGRAM STORIES, GAMES, AND ANIMATION

LET'S START!

- CREATE A NEW ACCOUNT IN SCRATCH AND THEN
- OPEN OUR SUMMER SCHOOL PROJECT

INTRODUCTION TO THE SCRATCH ENVIRONMENT

Scratch | File | Edit | Tutorials | Pac-Man Game | See Project Page | Save Now | MrbgSummerSchool2022

Code | Costumes | Sounds

Control

- wait 1 seconds
- repeat 10
- forever
- if then
- if then else
- wait until

THESE ARE CALLED "SPRITES"

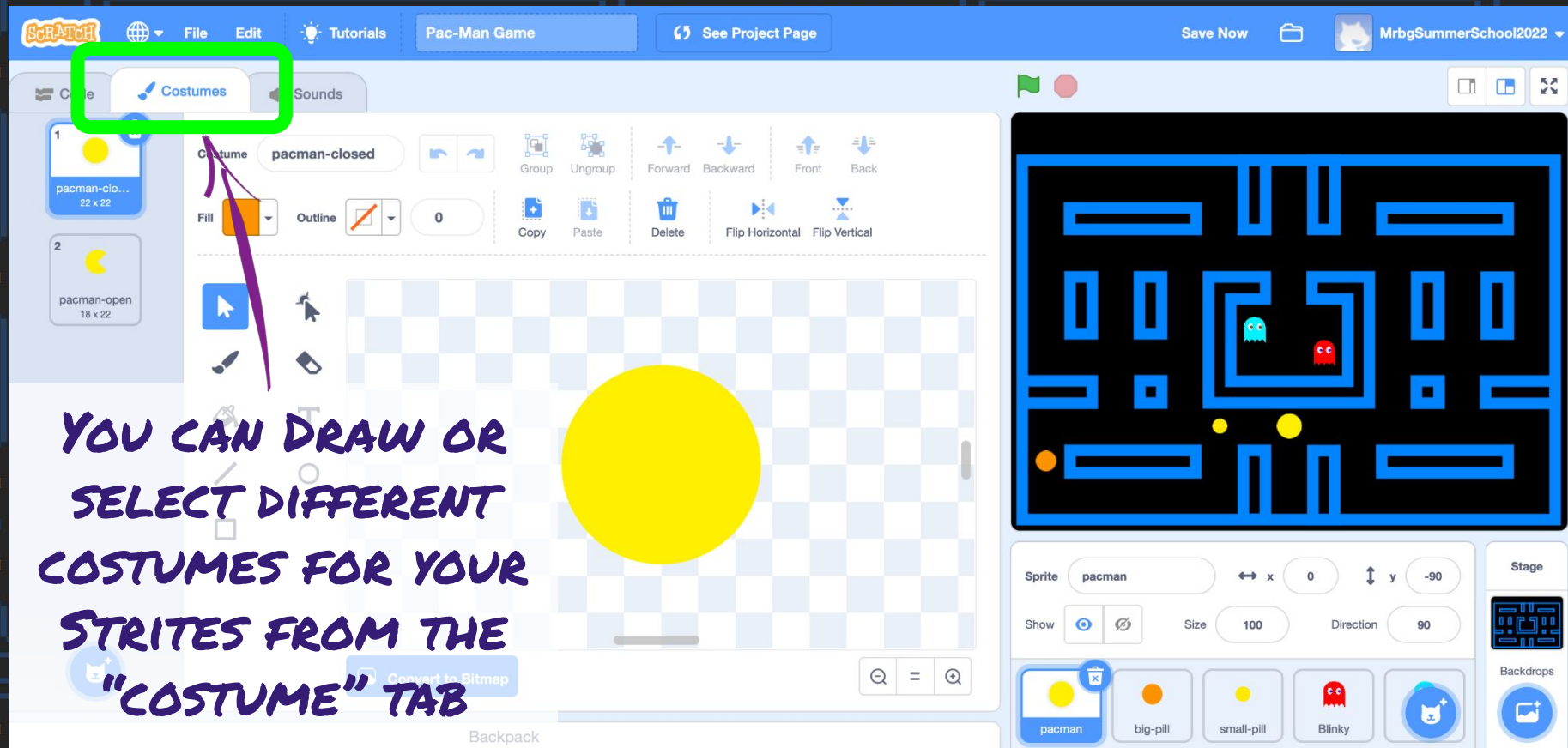
Stage

Sprite: pacman | x: 0 | y: -90 | Size: 100 | Direction: 90

Backdrops

pacman | big-pill | small-pill | Blinky

INTRODUCTION TO THE SCRATCH ENVIRONMENT



The screenshot displays the Scratch web interface. At the top, the 'Scratch' logo is on the left, and navigation links for 'File', 'Edit', 'Tutorials', 'Pac-Man Game', and 'See Project Page' are in the center. On the right, there are links for 'Save Now', a folder icon, and a user profile 'MrbgSummerSchool2022'. Below the navigation bar, the 'Costumes' tab is highlighted with a green rectangle. A purple arrow points from this tab to the 'pacman-closed' costume in the list on the left. The main workspace shows a yellow circle on a checkerboard background. To the right, a preview window shows a Pac-Man maze game with a Pac-Man character, a red ghost, and yellow pills. At the bottom, the 'Sprite' panel shows the 'pacman' sprite selected, with its position (x: 0, y: -90) and direction (90) displayed. The 'Backpack' panel is also visible at the bottom right.

COSTUMES

1 pacman-closed 22 x 22

2 pacman-open 18 x 22

YOU CAN DRAW OR SELECT DIFFERENT COSTUMES FOR YOUR SPRITES FROM THE "COSTUME" TAB

Sprite: pacman x: 0 y: -90

Show: [Eye Icon] [Eye Off Icon] Size: 100 Direction: 90

Backpack

INTRODUCTION TO THE SCRATCH ENVIRONMENT

The image shows the Scratch IDE interface for a project titled "Pac-Man Game". The top menu bar includes "Scratch", "File", "Edit", "Tutorials", "Pac-Man Game", "See Project Page", "Save Now", and a user profile "MrbgSummerSchool2022". The left sidebar shows the "Code" tab selected, with categories for Motion, Looks, Sound, Events, Control, Sensing, Operators, Variables, and My Blocks. The central workspace is empty, with the text "THIS IS THE STAGE" written in purple. A purple arrow points from this text to the stage area. The stage area is highlighted with a green box and contains a Pac-Man maze. The bottom panel shows the "Sprite" section with "pacman" selected, and the "Stage" section with a thumbnail of the maze. The "Backdrops" section shows a "pacman" backdrop and a "big-pill" backdrop.

Scratch

File Edit Tutorials Pac-Man Game See Project Page Save Now

Code Costumes Sounds

Control

wait 1 seconds

repeat 10

forever

if then

if then else

wait until

THIS IS THE "STAGE"

Sprite pacman x 0 y -90

Show Size 100 Direction 90

Stage

Backdrops

pacman big-pill small-pill Blinky

INTRODUCTION TO THE SCRATCH ENVIRONMENT

Scratch

File Edit Tutorials Pac-Man Game See Project Page Save Now

Code Costumes Sounds

Control

wait 1 seconds

repeat 10

forever

if then

if then else

wait until

THE "BACKDROPS" ARE THE IMAGES YOU CAN SELECT AS A BACKGROUND FOR YOUR STAGE

Sprite pacman x 0 y -90 Show Size 100 Direction 90

pacman big-pill small-pill Blinky

Stage

Backdrops

INTRODUCTION TO THE SCRATCH ENVIRONMENT

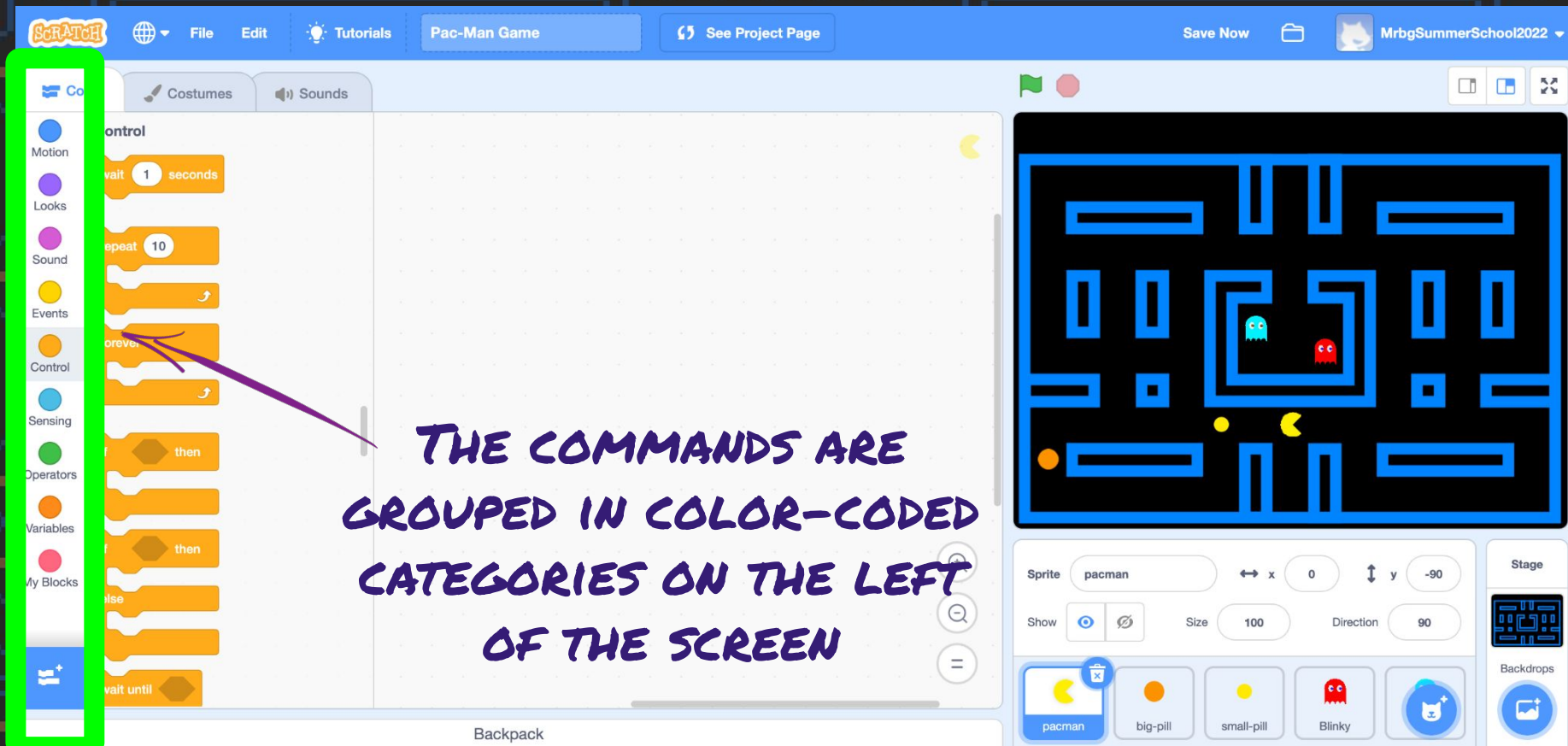
The image shows the Scratch web application interface. At the top, the title bar includes the Scratch logo, navigation menus (File, Edit, Tutorials), the current project name 'Pac-Man Game', and a 'See Project Page' button. On the right, there are 'Save Now' and a user profile icon for 'MrbgSummerSchool2022'.

The left sidebar contains several tabs: 'Code' (highlighted with a green box), 'Costumes', and 'Sounds'. The 'Code' tab is active, displaying a list of command categories: Motion, Looks, Sound, Events, Control, Sensing, Operators, Variables, and My Blocks. The 'Control' category is selected, showing a list of control blocks: 'wait 1 seconds', 'repeat 10', 'forever', 'if...then', 'if...then...else', and 'wait until'.

In the center workspace, there is a large text overlay in purple that reads: 'YOU CAN ADD CODE FROM THE "CODE" TAB IN ORDER TO MAKE YOUR STRITES FOLLOW COMMANDS'. A purple arrow points from this text to the 'Code' tab in the sidebar.

On the right side, the main stage displays a Pac-Man game. The stage is a black maze with blue walls. Pac-Man is a yellow character at the bottom center, and there are two ghosts, one blue and one red, in the maze. The stage is surrounded by a blue border. Below the stage, there is a 'Sprite' panel with a dropdown menu set to 'pacman', and a 'Stage' panel with a dropdown menu set to 'Stage'. The 'Sprite' panel also shows 'Show' (eye icon), 'Size' (100), and 'Direction' (90). The 'Stage' panel shows 'Backdrops' (a grid icon) and a 'Backdrops' button.

INTRODUCTION TO THE SCRATCH ENVIRONMENT



The screenshot displays the Scratch web interface. The top navigation bar includes the Scratch logo, a globe icon, and tabs for File, Edit, Tutorials, and the current project, "Pac-Man Game". On the right of the top bar are links for "See Project Page", "Save Now", and a user profile icon for "MrbgSummerSchool2022".

The left sidebar, which is highlighted with a green border, contains a vertical menu of command categories: Motion, Looks, Sound, Events, Control, Sensing, Operators, Variables, and My Blocks. The "Control" category is currently selected and highlighted in orange. A purple arrow points from the text "THE COMMANDS ARE GROUPED IN COLOR-CODED CATEGORIES ON THE LEFT OF THE SCREEN" to the "Control" category in the sidebar.

The main workspace is divided into two panels. The left panel is a script area with a grid background, showing a "wait 1 seconds" block. The right panel is a stage area displaying a Pac-Man game. The stage features a black maze with blue walls. Pac-Man, a yellow character, is at the bottom center. A red ghost is in the center, and a blue ghost is in the top left. A yellow pill is in the bottom right. The stage is titled "Pac-Man Game".

Below the stage is a sprite area with a "pacman" sprite selected. The sprite's properties are shown: x=0, y=-90, size=100, direction=90. The "Show" checkbox is checked. Below the sprite area are four buttons: "pacman", "big-pill", "small-pill", and "Blinky".

At the bottom of the screen is a "Backpack" section.

THE COMMANDS ARE GROUPED IN COLOR-CODED CATEGORIES ON THE LEFT OF THE SCREEN

INTRODUCTION TO THE SCRATCH ENVIRONMENT

The image shows the Scratch web interface. At the top, the title bar includes the Scratch logo, navigation buttons (File, Edit, Tutorials), the current project name "Pac-Man Game", a "See Project Page" button, and options to "Save Now" or open a folder. The user's profile "MrbgSummerSchool2022" is in the top right. Below the title bar, there are tabs for "Code", "Costumes", and "Sounds". The "Code" tab is active, showing a left sidebar with categories: Motion, Looks, Sound, Events, Control, Sensing, Operators, Variables, and My Blocks. The "Control" category is selected, displaying blocks like "wait 1 seconds", "repeat 10", "forever", "if...then", and "if...then...else". A "when green flag clicked" block is highlighted with a red circle and a red arrow. A text box with the text "THIS IS THE 'CODE AREA' WHERE YOU CAN DRAG AND DROP THE CODE" is overlaid on the code area. To the right of the code area is the stage, which displays a Pac-Man game with a maze, Pac-Man, and ghosts. Below the stage is the "Sprite" panel, showing the "pacman" sprite selected, with its position (x: 0, y: -90), size (100), and direction (90). The "Backdrops" panel is also visible at the bottom right.

Scratch

File Edit Tutorials Pac-Man Game See Project Page Save Now

Code Costumes Sounds

Control

wait 1 seconds

repeat 10

forever

if then

if then else

wait until

THIS IS THE "CODE AREA"
WHERE YOU CAN DRAG
AND DROP THE CODE

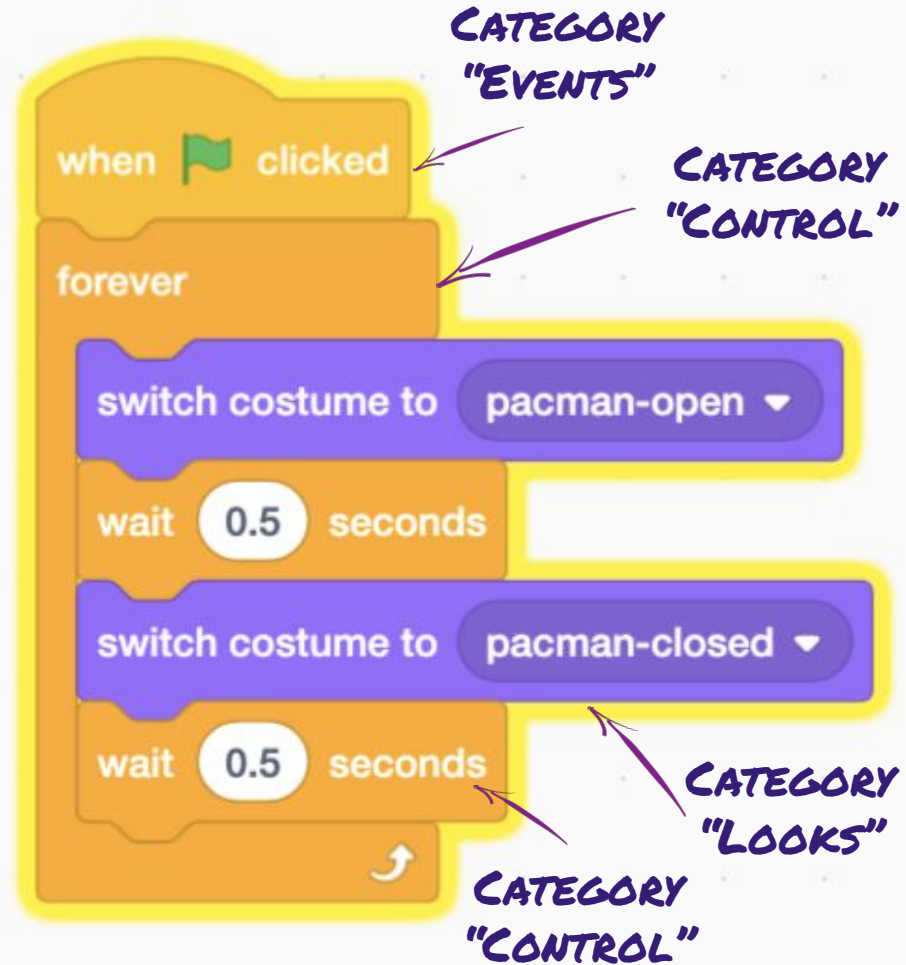
Sprite pacman x 0 y -90

Show Size 100 Direction 90

Backdrops

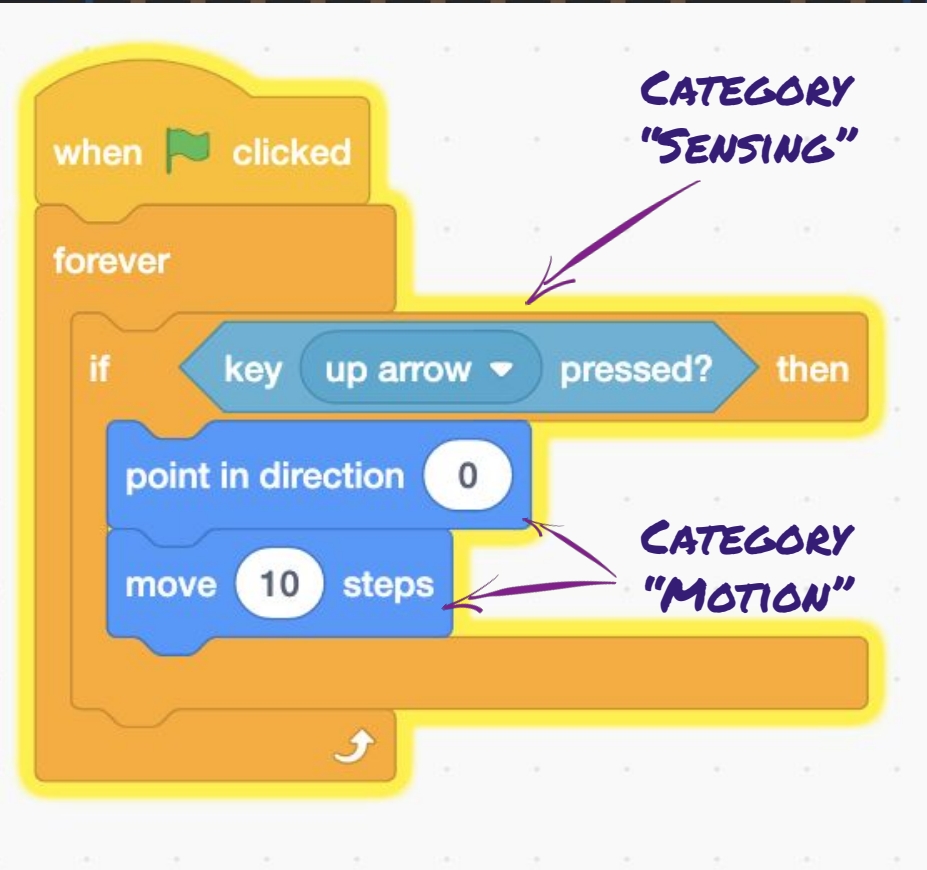
#1 ANIMATE PAC-MAN

- PAC-MAN OPENS AND CLOSES HIS MOUTH CONTINUOUSLY WHEN THE GAME STARTS



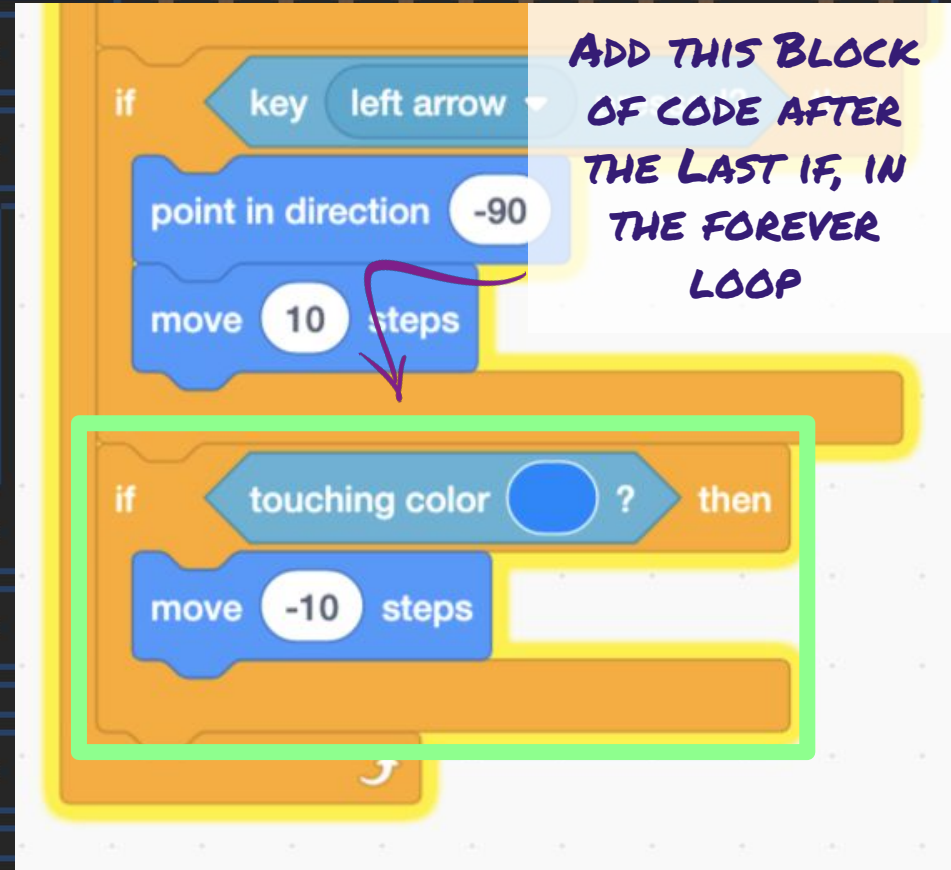
#2 MAKE PAC-MAN MOVE

- PAC-MAN MOVES WITH THE ARROW KEYS
- THIS BLOCK OF CODE MAKES HIM GO ONLY UP
- LET'S MAKE THE REST OF THE MOVES!



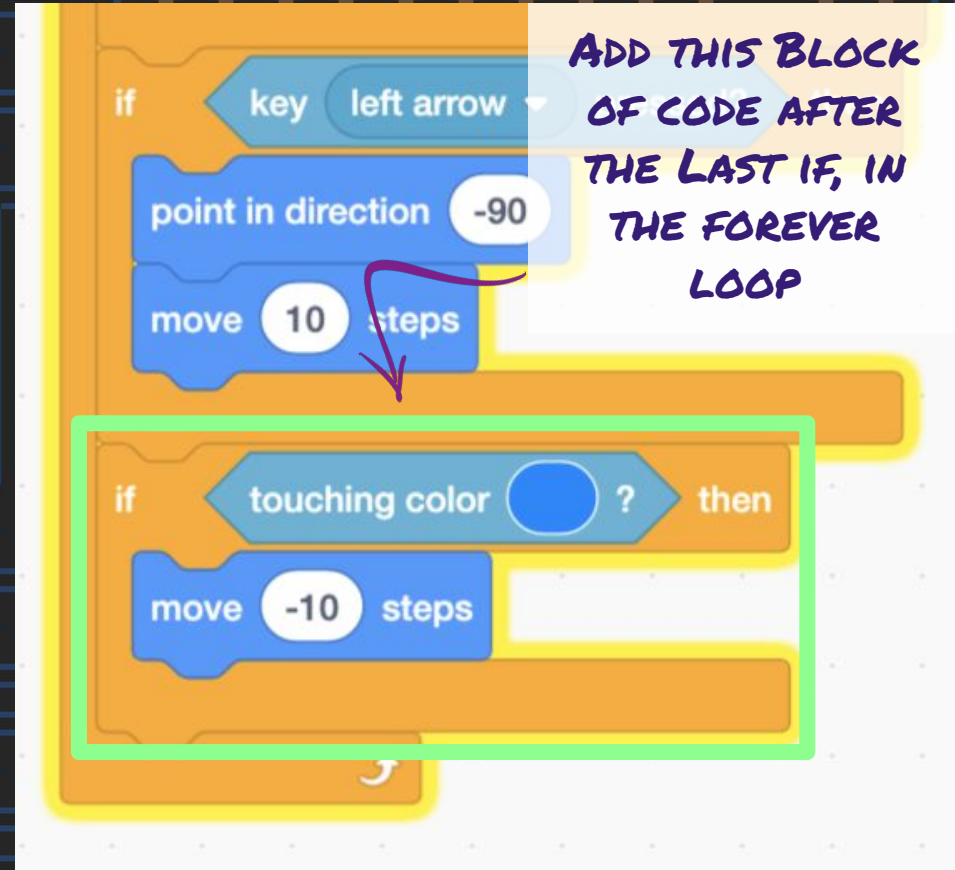
#3 LOCK PAC-MAN IN THE MAZE

- WE NEED TO ADD A CONDITION THAT CHECKS IF PAC-MAN TOUCHES THE WALLS OF THE MAZE



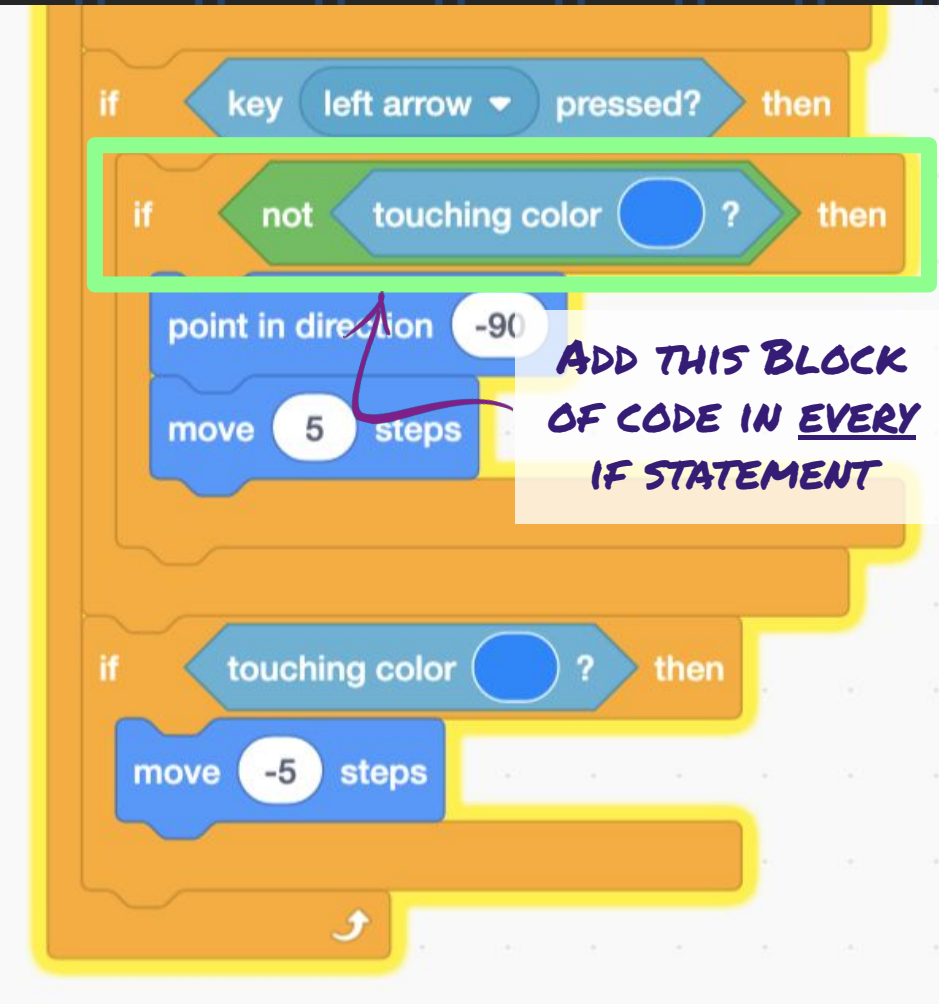
#3 LOCK PAC-MAN IN THE MAZE

- BUG DETECTED!!!
- WHAT HAPPENS IF WE PRESS MORE THAN ONE KEY?!?
- PAC-MAN CAN MOVE WITHIN WALLS DIAGONALLY 😱!!!



#3 LOCK PAC-MAN IN THE MAZE

- WE NEED TO MAKE SURE THAT PAC-MAN CAN'T MOVE WHEN HE TOUCHES THE WALL



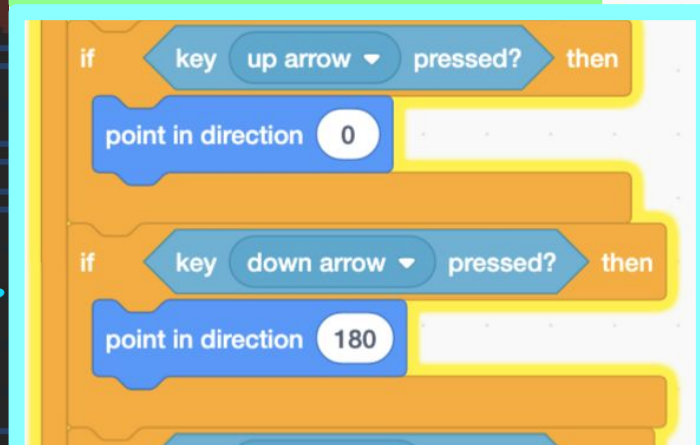
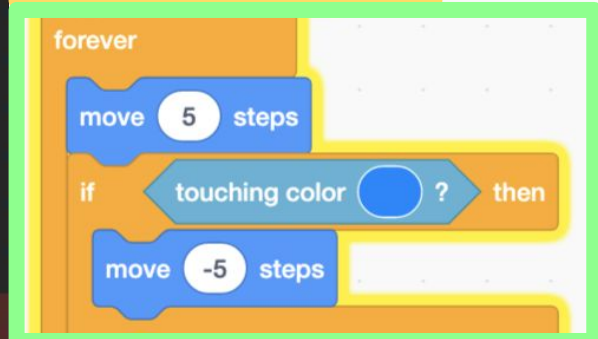
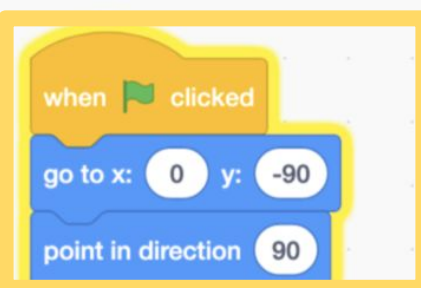
#4 IMPROVE THE PAC-MAN MOVEMENT

PAC-MAN MOVES CONTINUOUSLY UNTIL WE CHANGE HIS DIRECTION

- GO TO THE START POSITION
- POINT TO THE RIGHT DIRECTION
- CONSTANTLY MOVE UNTIL YOU REACH THE WALL
- CHANGE DIRECTION WHEN THE ARROW KEYS ARE PRESSED

#4 IMPROVE THE PAC-MAN MOVEMENT

- GO TO THE START POSITION AND POINT TO THE RIGHT DIRECTION
- CONSTANTLY MOVE UNTIL YOU REACH THE WALL
- CHANGE DIRECTION WHEN THE ARROW KEYS ARE PRESSED



#5 ADD THE PILLS

- ADD THE VARIABLE CALLED "SCORE"

New Variable

New variable name:

score

☒ For all sprites ☐ For this sprite only

Cancel

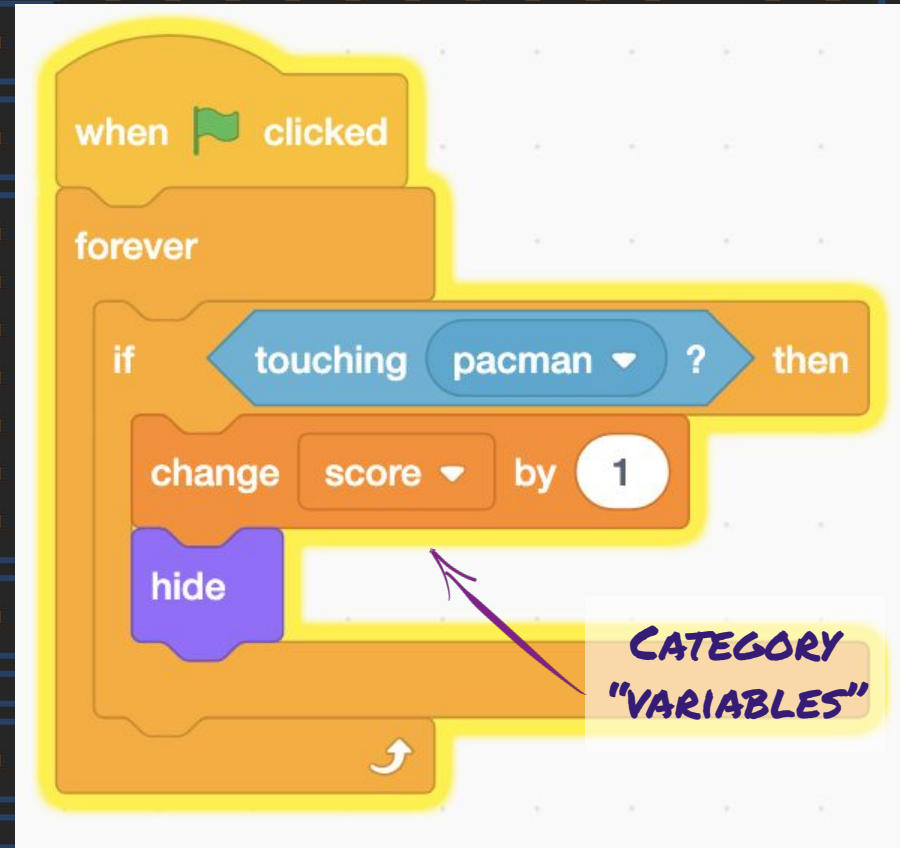
OK

#5 ADD THE PILLS

- ADD THE VARIABLE CALLED "SCORE"
- GO TO SPRITE "SMALL-PILL"

IF PAC-MAN TOUCHES THE PILL:

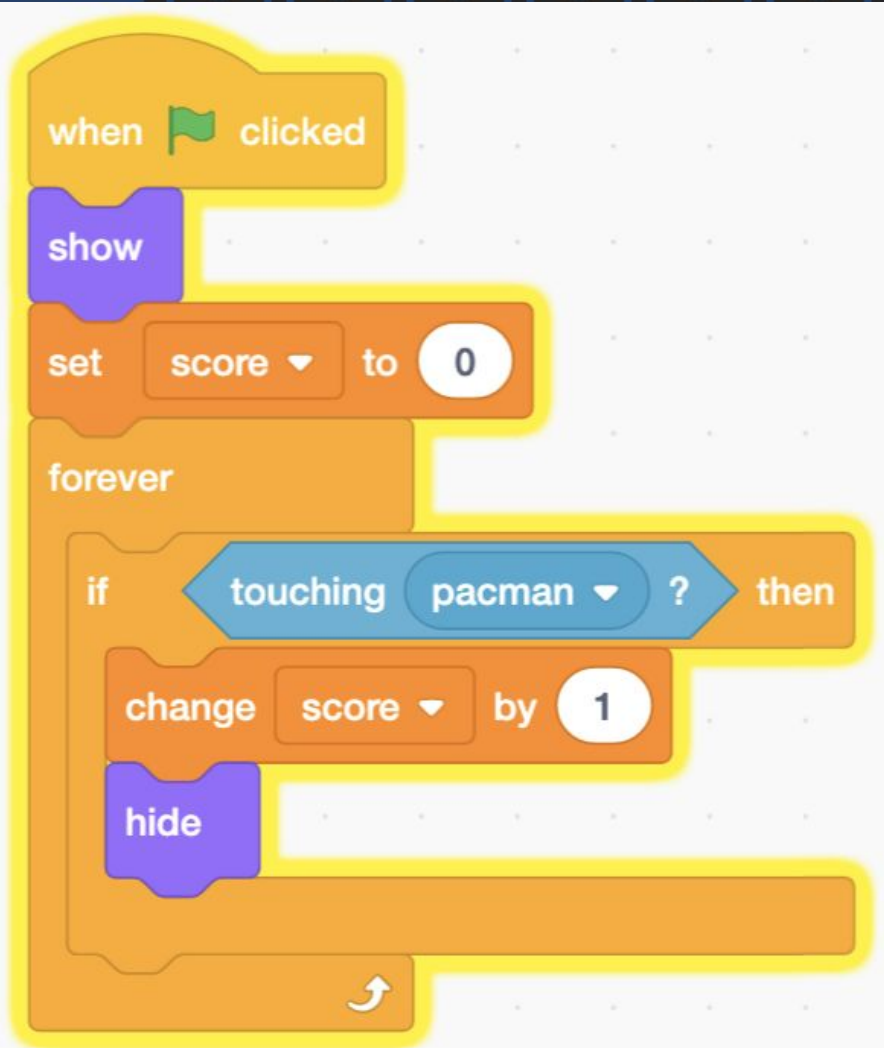
- CHANGE THE SCORE BY ONE
- HIDE THE PILL



#5 ADD THE PILLS

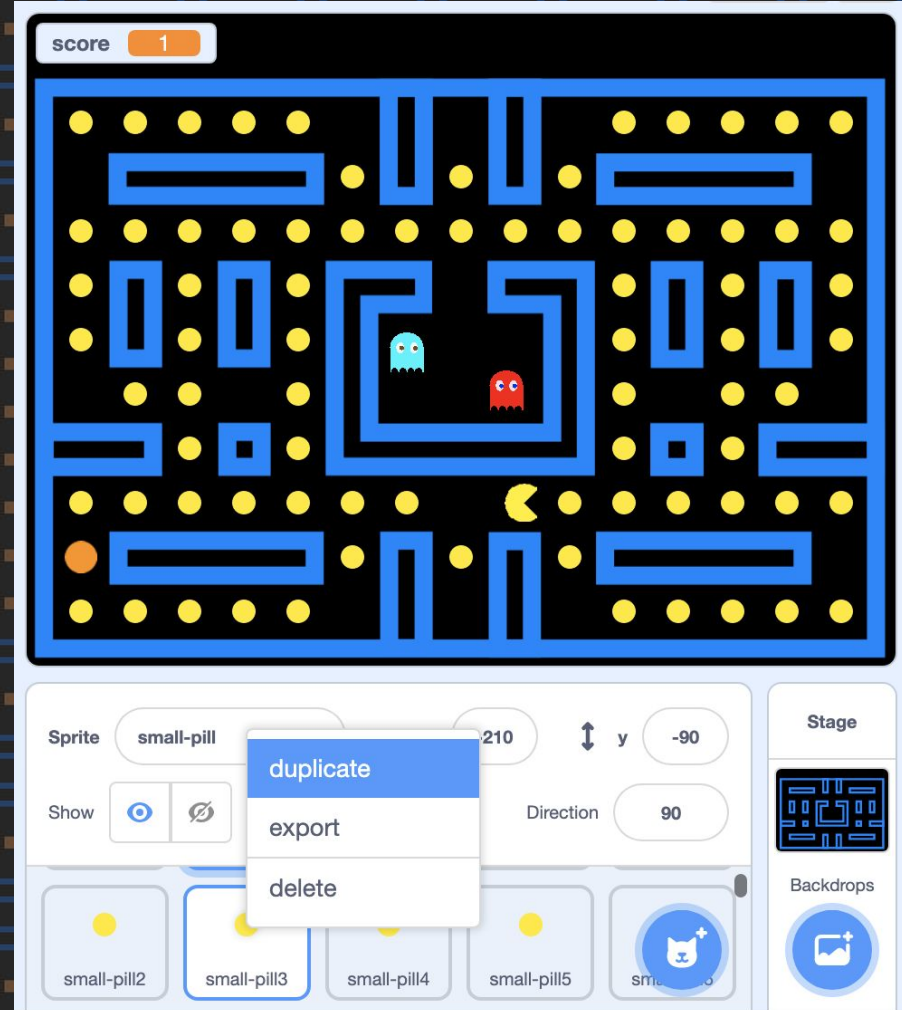
EVERY TIME THE GAME STARTS:

- SHOW THE PILL
- SET THE SCORE TO ZERO



#5 ADD THE PILLS

- DUPLICATE THE "SMALL-PILL" SPRITE
- PUT THE PILLS IN THE DESIRABLE POSITIONS
- DO THIS FOR 1-2 PILLS AND LEAVE THIS STEP FOR THE END



#6 MOVE GHOSTS IN RANDOM POSITION

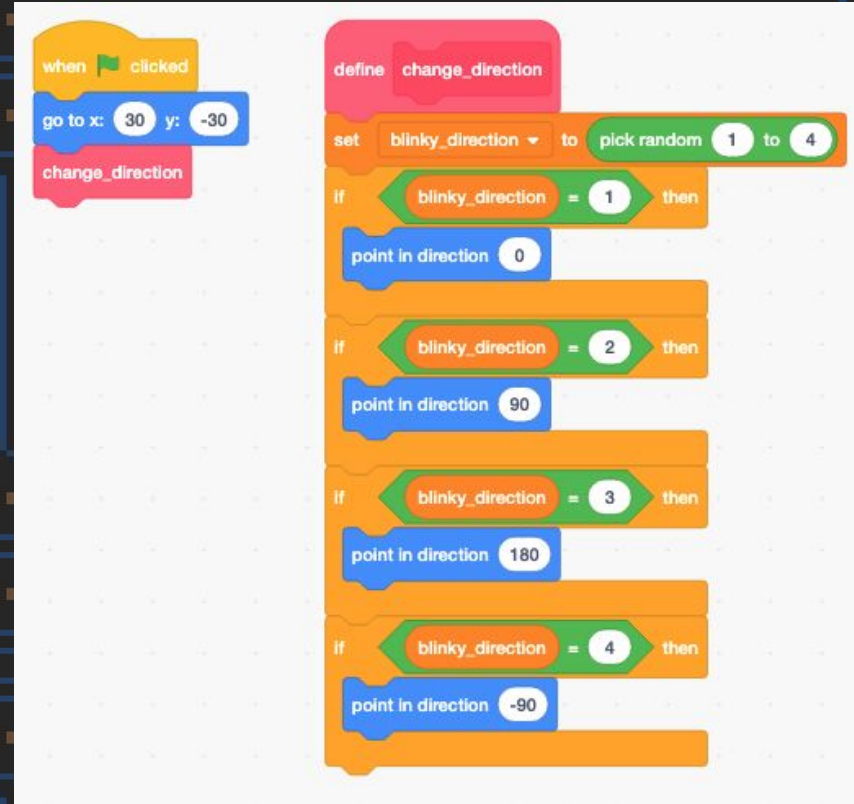
- CREATE A NEW VARIABLE CALLED "BLINKY_DIRECTION"
- THE VARIABLE SHOULD BE SET TO A RANDOM VALUES FROM 1 TO 4
- EACH NUMBER CORRESPONDS TO A DIRECTION:

○ 1	☞	↑
○ 2	☞	→
○ 3	☞	↓
○ 4	☞	←
- DEPENDING ON THE NUMBER, POINT BLINKY TO THE CORRESPONDING DIRECTION



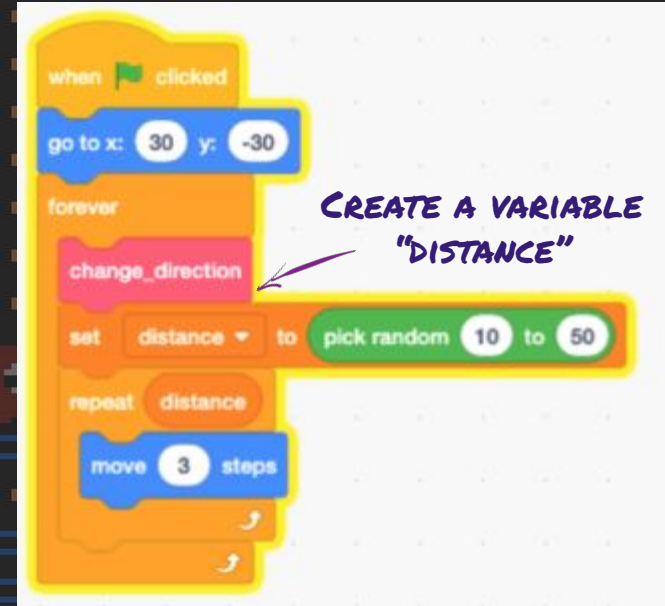
#6 MOVE GHOSTS IN RANDOM POSITION

- THERE ARE MANY OCCASIONS FOR WHICH WE NEED TO CHANGE THE DIRECTION TO WHICH THE GHOST IS GOING:
 - E.G. WHEN THE GHOST HITS THE WALL
- 💡 HINT: INSTEAD OF COPYING THE CODE MULTIPLE TIMES, WE MAKE A REUSABLE BLOCK OF CODE



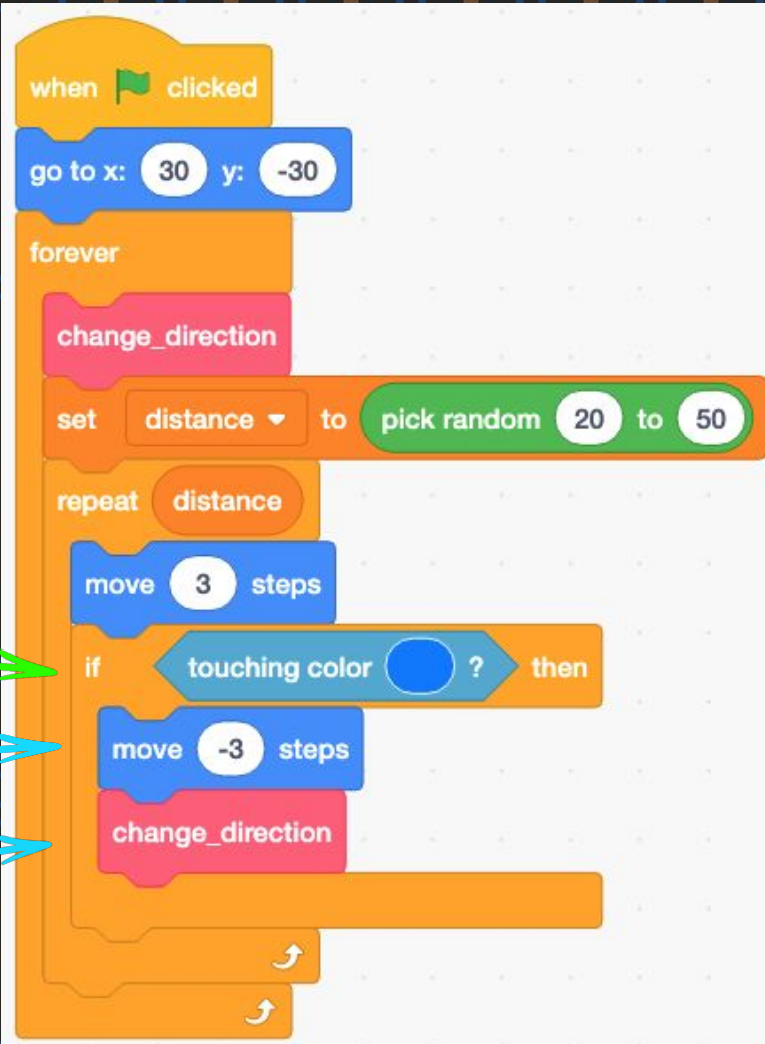
#6 MOVE GHOSTS IN RANDOM POSITION

- WE WANT THE GHOST TO
MOVE RANDOMLY:
 - RUNS A RANDOM
DISTANCE
 - THEN CHANGE
DIRECTION AND
CONTINUE MOVING



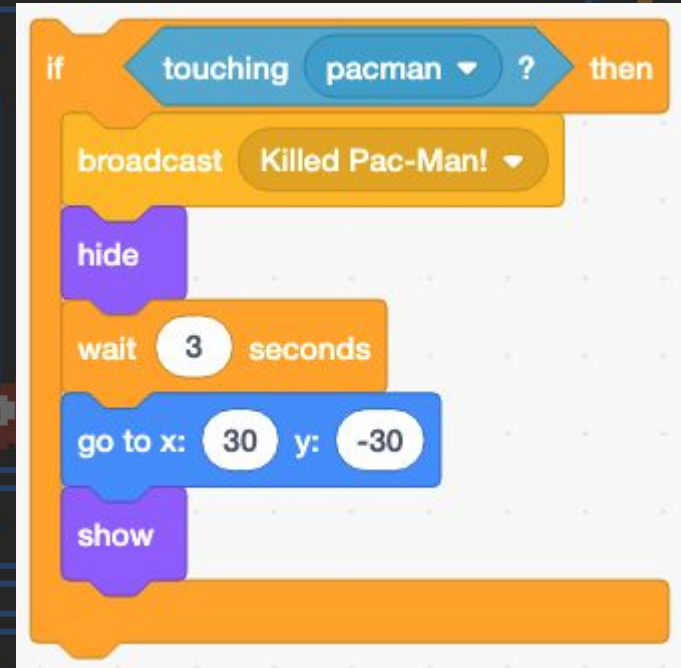
#6 MOVE GHOSTS IN RANDOM POSITION

- WE NEED TO LOCK THE GHOST IN THE MAZE!
- WHEN THE GHOST TOUCHES THE WALL:
 - MOVE IT BACK
 - CHANGE DIRECTION



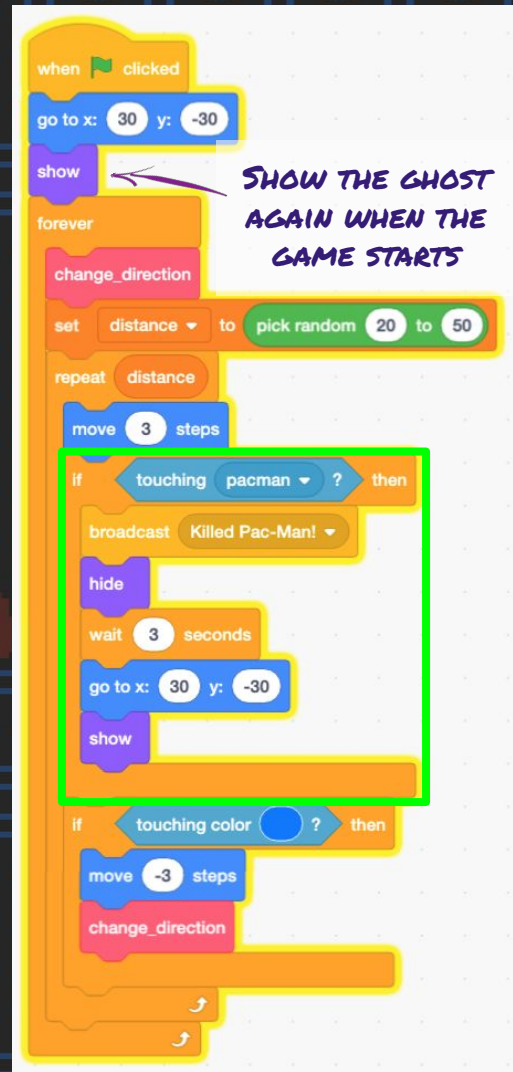
#7 HOW TO MAKE THE GHOSTS KILL PAC-MAN 🤯💀🪦

- IF THE GHOSTS TOUCHES PAC-MAN, THEN THE GHOST:
 - BROADCASTS A MESSAGE
 - HIDES
 - WAITS FOR 3 SECONDS
 - GOES BACK TO ITS INITIAL POSITION
 - SHOWS UP AGAIN
- WHERE SHOULD WE PUT THIS BLOCK OF CODE???



#7 HOW TO MAKE THE GHOSTS KILL PAC-MAN 🤯💀🪦

- IF THE GHOSTS TOUCHES PAC-MAN, THEN THE GHOST:
 - BROADCASTS A MESSAGE
 - HIDES
 - WAITS FOR 3 SECONDS
 - GOES BACK TO ITS INITIAL POSITION
 - SHOWS UP AGAIN
- WHERE SHOULD WE PUT THIS BLOCK OF CODE???



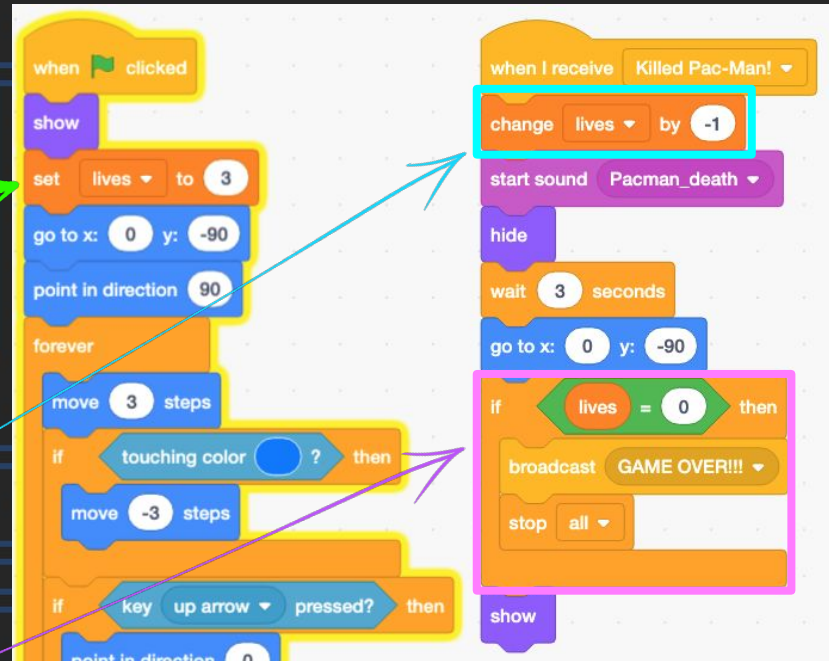
#7 HOW TO MAKE THE GHOSTS KILL PAC-MAN 🤪💀🪦

- IF THE GHOSTS TOUCHES PAC-MAN, THEN PAC-MAN:
 - PLAYS A "DEATH SOUND"
 - HIDES
 - WAITS FOR 3 SECONDS
 - GOES BACK TO ITS INITIAL POSITION
 - SHOWS UP AGAIN



#8 MAKE PAC-MAN LOSE A LIFE 🤪💀🪦

- CREATE A VARIABLE "LIVES"
- EVERY TIME YOU START A GAME, YOU WILL HAVE A SPECIFIC NUMBER OF LIVES
- REDUCE THE NUMBER OF LIVES WHEN PAC-MAN DIES
- STOP THE GAME WHEN THERE ARE NO MORE LIVES



#8 MAKE PAC-MAN LOSE A LIFE

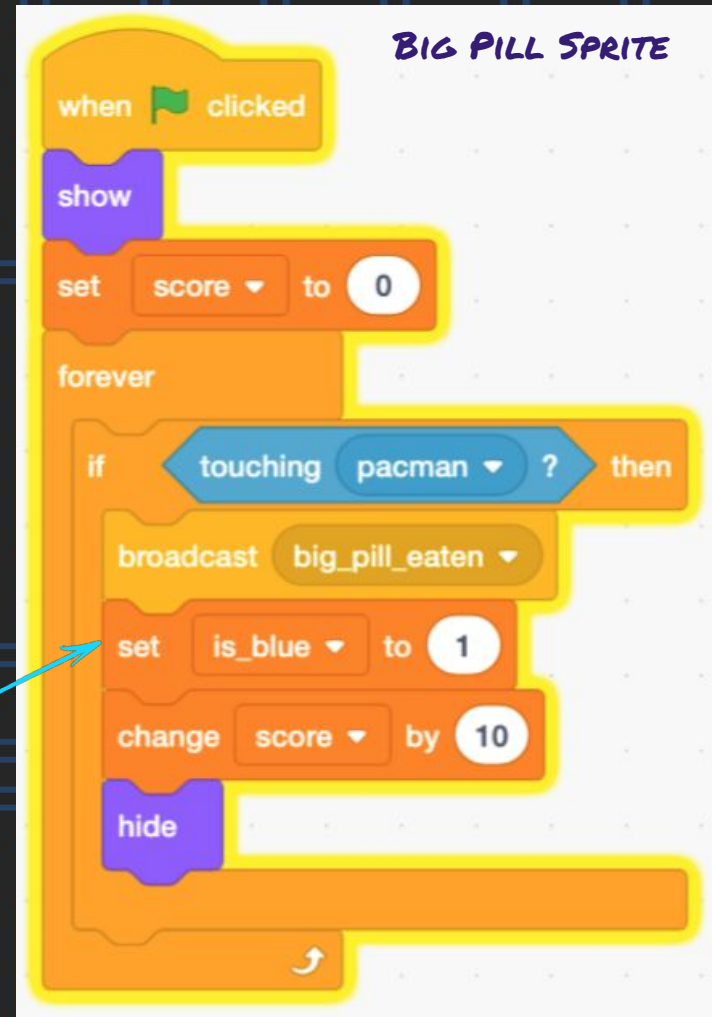


- SHOW A MESSAGE "GAME OVER"
- EXTRA POINTS: MAKE IT "FLASH"



#9 CREATE EDIBLE GHOSTS

- WHEN PAC-MAN EATS THE BIG PILL, HE GAINS AN EXTRA POINTS
- A MESSAGE THAT THE BIG PILL IS EATEN IS BROADCASTED
- WE CREATE A VARIABLE "IS_BLUE" THAT INDICATES WHETHER THE GHOST IS BLUE OR NOT



#9 CREATE EDIBLE GHOSTS

- WHEN THE BLUE PILL IS EATEN:
 - THE GHOSTS TURN BLUE FOR, E.G. 10 SECONDS
 - THEN THEY TURN BACK TO THEIR ORIGINAL COLOR
 - AND THE VARIABLE "IS_BLUE" NEEDS TO GO BACK TO ZERO



#9 CREATE EDIBLE GHOSTS

- WHEN THE GHOST IS NOT BLUE AND IT TOUCHES PAC-MAN, PAC-MAN DIES
- WHEN THE GHOST IS BLUE AND IT TOUCHES PAC-MAN, PAC-MAN GAINS POINTS

!! WHEN THE GAME STARTS, REMEMBER:

- CHANGE GHOSTS TO THE ORIGINAL COSTUME
- SET IS_BLUE TO ZERO



BLINKY

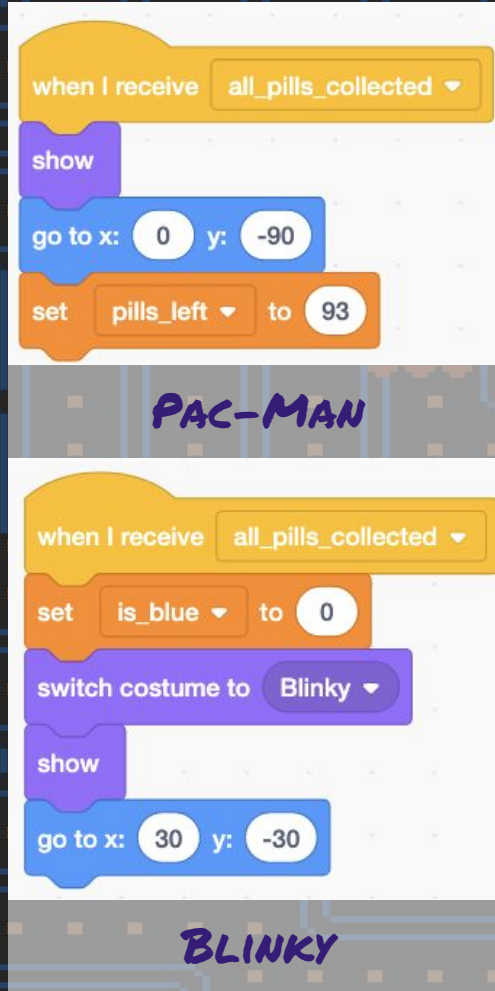
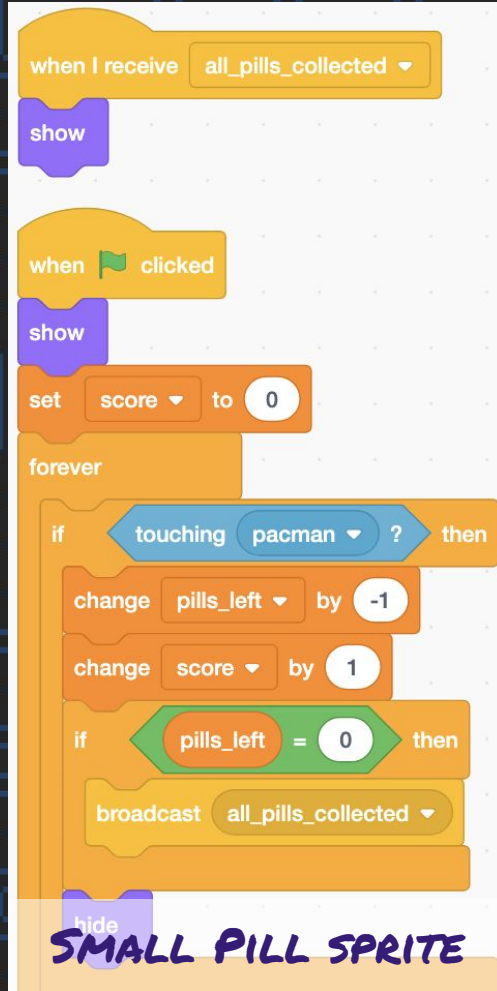
#10 LET'S MAKE MORE GHOSTS!

- DUPLICATE THE GHOST SPRITE
- CHANGE THE COSTUMES INSIDE THE CODE!
- CHANGE THE POSITION FROM WHERE THE SPRITE SPAWNS AND RE-SPAWNS
- YOU CAN CHANGE THE SPEED OF EACH GHOST AND THE DISTANCES THEY RUN

#11 FINAL STEP: END THE LEVEL

- COUNT ALL THE PILL SPRITES ON THE GAME (BIG AND SMALL)
- CREATE A VARIABLE NAMED "PILLS_LEFT" AND SET ITS VALUE TO THE TOTAL NUMBER OF THE PILLS WHEN THE GAME STARTS
- EVERY TIME PAC-MAN EATS A PILL (SMALL OR BIG), THE VARIABLE "PILLS_LEFT" HAS TO DECREASE
- IF THERE ARE NO PILLS LEFT, THEN EVERYTHING HAS TO RE-SPAWN AT ITS ORIGINAL POSITION (AND WITH ITS ORIGINAL SKIN)

ONCE YOU ARE DONE, YOU CAN COPY THE PILLS AND PLACE THEM WHEREVER YOU LIKE!



BE CREATIVE!!!

- MAKE YOUR OWN COSTUMES
- IF PAC-MAN LIKES FAST FOOD, THEN MAKE FRUIT APPEAR IN RANDOM PLACES AND REDUCE THE SCORE EVERY TIME HE EATS HEALTHY
- MAKE THE FRUIT MOVE AROUND
- CHOOSE A DIFFERENT BACKSTAGE, DIFFERENT COLORS, DIFFERENT LAYOUT

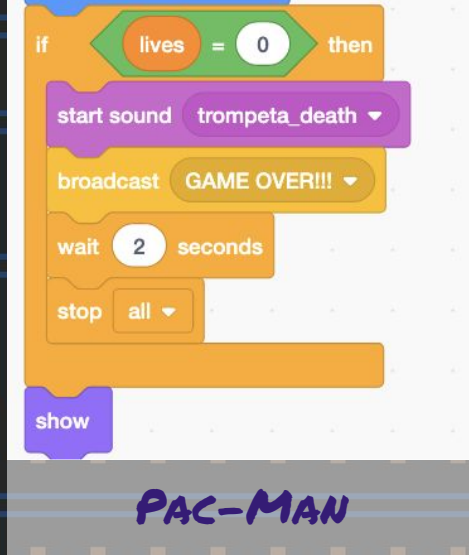
MAKE SOME ADDITIONAL TWEAKS

- SHOW A MESSAGE "YOU WIN!" EVERY TIME YOU COLLECT ALL PILLS
- ADD SOUND EFFECTS:
 - PLAY A SOUND WHEN YOU LOSE ALL LIVES
 - ADD A SOUND EFFECT EVERY TIME PAC-MAN COLLECTS A PILL
 - PLAY MUSIC DURING THE ENTIRE GAME
- INSTEAD OF A "LIVES" COUNTER, ADD HEARTS THAT DISAPPEAR EVERY TIME YOU LOSE A LIFE
- WARN THE PLAYER WHEN THE GHOSTS ARE GOING TO TURN FROM BLUE BACK TO NORMAL BY FLASHING THEM

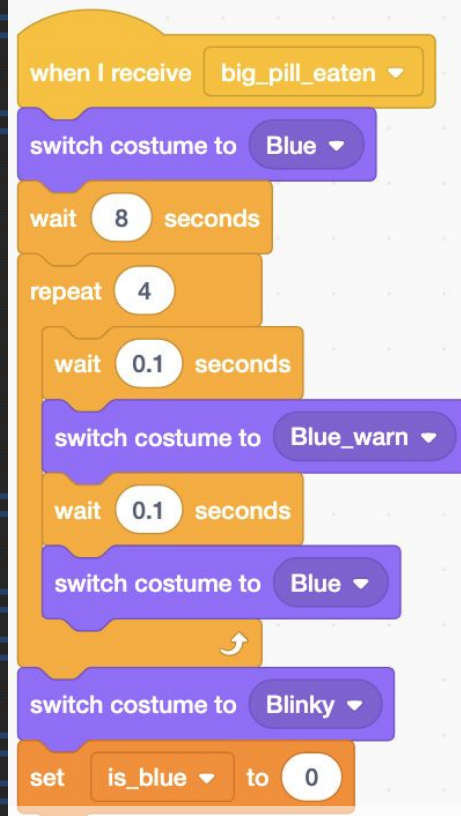
MAKE SOME ADDITIONAL TWEAKS



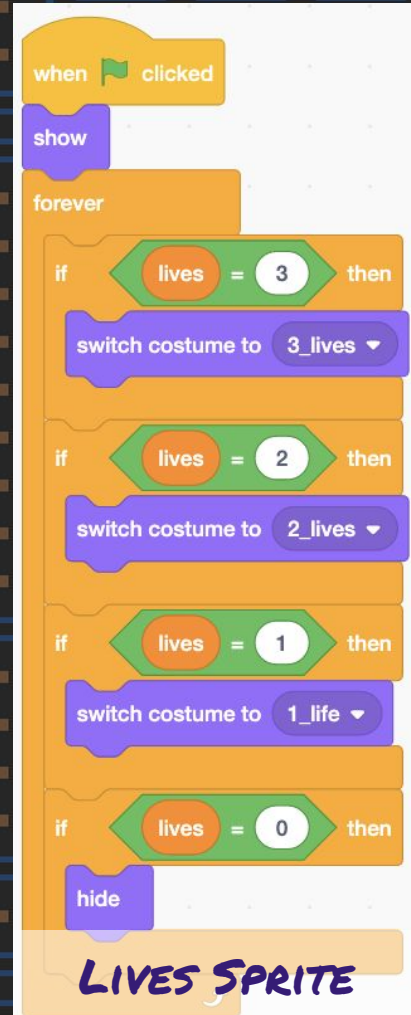
YOUWIN SPRITE



PAC-MAN



BLINKY



LIVES SPRITE