

Engineering Basics

It's GAME time

Games and programming languages



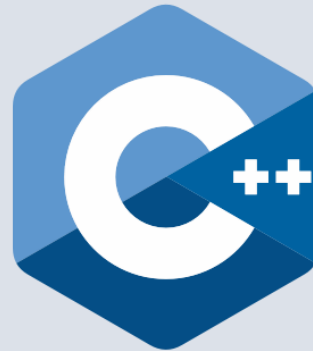
is written
in



is developed
using



is coded
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is modded in



in



is made with



Game Development: Common Terms

- ***Asset***
- ***Agent***
- ***AI***
- ***Collision and collision detection***
- ***Event***
- ***Non-playable character, or non-player character (NPC)***
- ***Sprite***
- ***Terrain***
- ***Tile***
- ***Tilemap***

PacMan

Pac-Man is a maze arcade game developed and released by Namco in 1980

Generally considered to be amongst the best video games ever produced.

Written in C.

On the righthand side is compilation of actual gameplay footage.



Exercise 1

- Describe PacMan.
 - What is the game about?
 - What must be in the game for it to be a PacMan game?
- Write 2-3 paragraphs about the game

Can you make me a game...

Game characters

Game objects
(non-characters)

That has a cheese that chases small dots for points and tries to avoid being caught by ghosts.

Behaviour

PacMan description from Wikipedia

Pac-Man is a maze chase video game; the player controls the eponymous character through an enclosed maze. The objective of the game is to eat all of the dots placed in the maze while avoiding four colored ghosts — Blinky (red), Pinky (pink), Inky (cyan), and Clyde (orange) — that pursue him. When all of the dots are eaten, the player advances to the next level. If Pac-Man makes contact with a ghost, he will lose a life; the game ends when all lives are lost. Each of the four ghosts have their own unique, distinct artificial intelligence (A.I.), or "personalities"; Blinky gives direct chase to Pac-Man, Pinky and Inky try to position themselves in front of Pac-Man, usually by cornering him, and Clyde will switch between chasing Pac-Man and fleeing from him.

Placed at the four corners of the maze are large flashing "energizers", or "power pellets". Eating these will cause the ghosts to turn blue with a dizzied expression and reverse direction. Pac-Man can eat blue ghosts for bonus points; when eaten, their eyes make their way back to the center box in the maze, where the ghosts are "regenerated" and resume their normal activity. Eating multiple blue ghosts in succession increases their point value. After a certain amount of time, blue-colored ghosts will flash white before turning back into their normal, lethal form. Eating a certain number of dots in a level will cause a bonus item, usually in the form of a fruit, to appear underneath the center box, which can be eaten for bonus points.

The game increases in difficulty as the player progresses; the ghosts become faster and the energizers' effect decreases in duration, to the point where the ghosts will no longer turn blue and edible. To the sides of the maze are two "warp tunnels", which allow Pac-Man and the ghosts to travel to the opposite side of the screen. Ghosts become slower when entering and exiting these tunnels. Levels are indicated by the fruit icon at the bottom of the screen. In-between levels are short cutscenes featuring Pac-Man and Blinky in humorous, comical situations. The game becomes unplayable at the 256th level due to an integer overflow that affects the game's memory.

Requirements

Software requirements are description of features and functionalities of the target system

Must be Specific, Measurable, Achievable, Realistic, and Timely.

Exercise 2

- Using your description from exercise 1, convert your description into requirements.
 - Look out for nouns (characters and game objects)
 - Look out for verbs (behaviour)
- Extra requirement
 - You must make it your own somehow (I made PacWoman)

Turning description into requirements

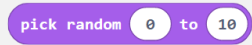
- Player-controlled character that moves in four directions using arrow keys
- 4 NPCs that pursue the player controlled character
- Objects (pellets) that the player-controlled character can pick up to earn points
- A maze with walls that neither the player nor NPCs can move through
- Objects (power pellets) that when picked up by player-controlled character make the NPCs stop chasing and flee (move away) from player character

...

- Player-controlled character must be yellow
- NPC characters must be non-yellow and look like ghosts
- Pellets must be 10px * 10 px
- Power pellets must be 20 px * 20px

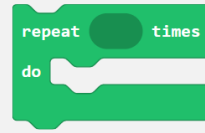


Make Code: Arcade



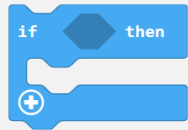
Math

More complex operations with numbers.



Loops

Loops and repetition.



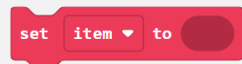
Logic

Logic operators and constants.



Arrays

Add, remove, and replace items in lists.



Variables

Variables.

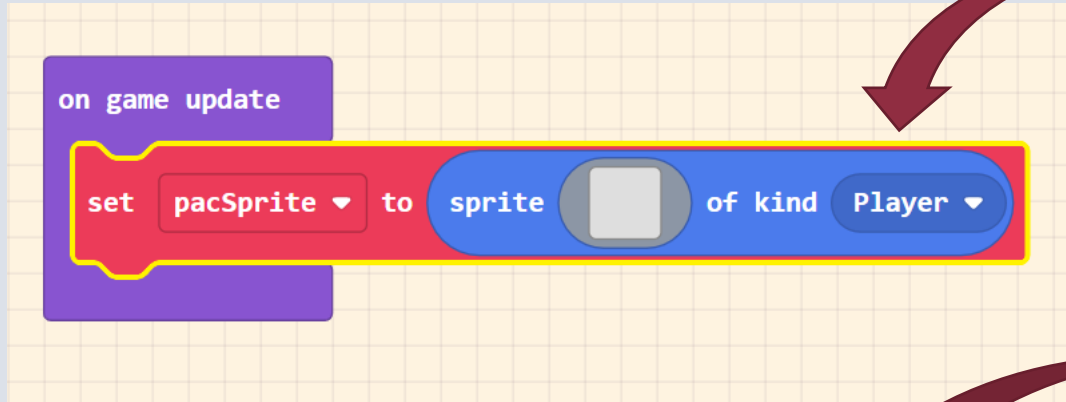


text

Combine, split, and search text strings.

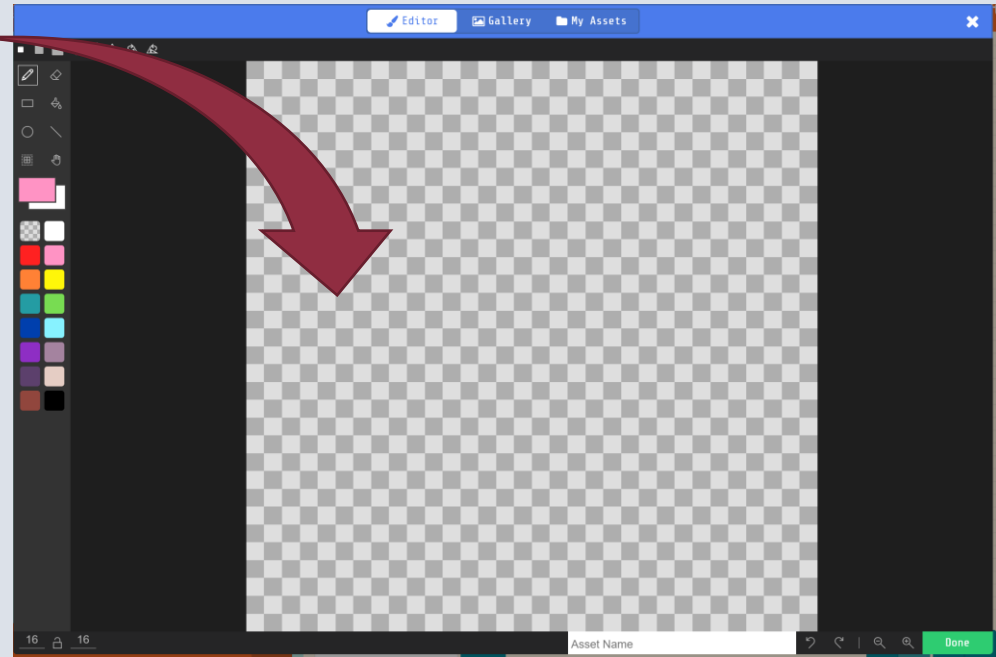
Blocks

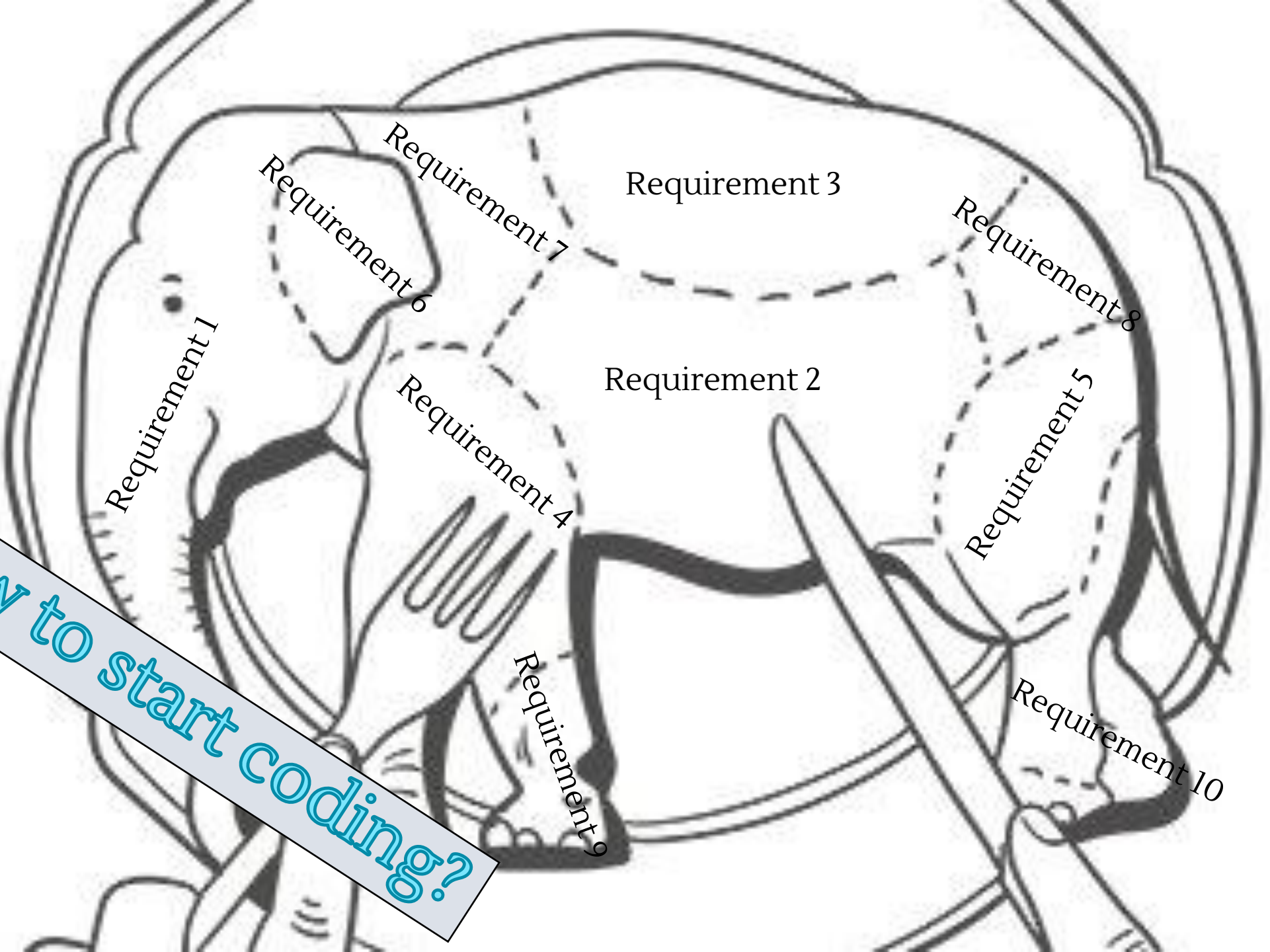
How to create a sprite



Add sprite to code

Draw sprite
(or choose from assets)





How to start coding?

Exercise 3

- Using your requirements in exercise 2, create PacMan using MakeCode Arcade.
- If you get stuck, google “makecode arcade” + what you can’t figure out 😊

Exercise 4 (for the quick ones or for next time)

- Think of your favorite “old school” game and go through exercise 1-3 to recreate it.
- Get creative and make your own game completely.