

Exercises week 2

1 Media Technology

Write an application that loops from 1 to 100. If the current number is divisible by 3, print “Media”. If the number is divisible by 5, print “Technology”. If the number is divisible by 15, write “Media Technology”¹.

2 Loops (check assignment I)

We are now going to draw things on the screen with loops. To get some practice, first do the exercise without for loops. If you are having trouble, think about what quantity changes in the problem.

1. Draw five circles next to each other horizontally on the screen.
2. Draw a 5x5 grid of circles (tip: use two loops!)
3. Draw the bottom left half (a triangle) of a 5x5 grid (tip: think about the conditions of the second loop).

3 Approximating π

We are going to build a program that approximates π using random numbers.

1. Make sure the screen is 640x640 pixels.
2. Randomly draw dots on the screen.
3. Now give the dots a different colour when they fall within a quarter circle where the center is the top left corner and the radius is 640 (see figure 1).

¹This assignment is often asked at job interviews to test if the interviewee knows how to program.

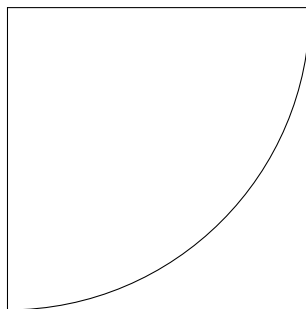


Figure 1: Dots should be given a different colour if they fall in the quarter circle.

4. What is the probability that a random point falls inside the circle (hint: this can be derived from the surface of the quarter circle vs. the total surface)?
5. The probability of placing a point into the circle can also be approximated by counting how often a random point falls into the circle. Add a count for this in your program and derive from this an approximation for π .
6. Print the estimate for π . How long does it take to get to 3.14? You can speed up the process by increasing the framerate.

4 Functions

We are now going to write our own functions. If you are having trouble, always ask yourself the following questions before writing code. What does the function receive as arguments and what does it return. Also note the types. For example, the function `sin`, which calculates the sine, gets an angle and returns a number. It receives a float and returns a float. Afterwards, test your function by calling it with test arguments. For example $\sin(\pi/2)$ should return 1.

1. Write a function “multiplyTwo” that multiplies a number by 2.
2. Write a function “multiply” that multiplies a number by another number.
3. Write a function called “distance” that calculates the distance between two points on the screen.

5 Input (check assignment II)

1. Write a simple drawing application that draws a line between the current mouse position and the last mouse position (pmouseX and pmouseY) if the mouse is pressed.
2. Draw a pacman (or a circle if you don't have time) on the screen that moves to the mouse with a given speed. If you click the mouse, you push the pacman away by moving the pacman back in the direction it came from.
3. Move an object across the screen by using the arrow keys (you may have to read up on keyCode).