**15-104 Introduction to Computing for Creative Practice – FALL 2023**

NAME: ENTER YOUR NAME HERE

ANDREW ID: ENTER YOUR ANDREW ID HERE

SECTION: ENTER YOUR SECTION LETTER HERE (A-E)

**CONCEPTS QUESTIONS 8**

Enter your answers to each of these questions in the space provided. Do not use online tools (including AI tools). Do not consult with other students when answering these questions. The information you fill in should be your work and only your work.

**Use the following p5.js object definition of a simple blue fish for problems 1-3**:

function makeFish(fx, fy) {  
 // create and return a new object representing a blue fish  
 var f = { x: fx, y: fy, c: color(0, 0, 255),   
 swim: moveFish, show: drawFish } ;  
 return f;  
}  
  
function moveFish(fdx) {   
 // update fish position horizontally by amount fdx  
 // NOT SHOWN  
}  
  
function drawFish(facingLeft) {   
 // draw fish at current position, facing left or right  
 // NOT SHOWN  
}

1. How do we write the body of the **moveFish** function, if we don't care if the fish moves off the canvas? (It’s only one line of code.)  
     
     
   YOUR ANSWER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. The following instruction is used to create a simple blue fish:

var dory = makeFish(100, 100);

Suppose the fish may have moved since it was created. What function call would you make to have this fish move to the right 50 pixels from its current position (regardless of the direction it’s facing)? (It’s only one line of code.)  
  
  
YOUR ANSWER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What data type is best suited for the parameter **facingLeft** in the function   
   **drawFish**, assuming the parameter indicates whether the fish is facing left or not.

YOUR ANSWER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Recall that linear search is an O(n) algorithm. If a linear search takes 1 millisecond   
   (= 10-3 second) to search through an array of a thousand (103) data elements in the worst case, approximately how long in seconds would you expect to wait for it to search through an array of a billion (109) data elements in the worst case?   
     
     
     
   YOUR ANSWER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ seconds