

Practice Quiz 3

1. Refer to the program below as you respond to the following questions.

```

1 export let main = async () => {
2   let x = foo([9, 4, 5, 3, 2]);
3 };
4 let funk = (arr: number[]): number[] => {
5   for (let i = 0; i < arr.length; i++) {
6     if (arr[i] > 5) {
7       arr[i]++;
8     } else {
9       arr[i]--;
10    }
11  }
12  return arr;
13 };
14 let foo = (nums: number[]): number[] => {
15   let i = 0;
16   while (i < nums.length) {
17     nums[i] += i;
18     i++;
19   }
20   return funk(nums);
21 };
22 main();

```

1.1 A variable named `i` is declared on both lines 5 and 15, yet the program does not generate an error. Why?

1.2 Fill the boxes with the values stored in `x` after the program completes.

0	1	2	3	4

2. Write in an expression or term for each of the questions below.

2.1 The special variable declarations that are placeholders for the inputs a function needs are called:

2.2 The valid code expression to access the length of a string array named `arr` is:

2.3 The last index of an array `arr` is always (represent this in terms of the length of `arr`):

3. Using the code listing below, identify the printed output. If multiple things are printed, separate them with commas.

```

1 let s = ["h", "i", "y", "a"];
2 let r = "";
3
4 for (let b = s.length - 1; b >= 0; b--) {
5   r = s[b] + r;
6 }
7 print(r);

```

4. Fill in each box with a function call that will return the specified value. If the specified value is logically unreachable, write `"n/a"`. (hint: one of them is unreachable). Note that, for all reachable return values, there are many possible correct responses. The first one is completed for you.

```

1 let foo = (x: number): string => {
2   if (x % 3 === 0) {
3     return "A";
4   } else {
5     return "B";
6   }
7 };
8 let bar = (y: number, z: number): string => {
9   if (y + z > y) {
10    return "C";
11  }
12  return "D";
13 };
14 let funk = (a: number): string => {
15   if (a * 2 % 2 === 0) {
16     return "F";
17   }
18   return "E";
19 };

```

4.1 "A"

foo(3)

4.2 "B"

4.3 "C"

4.4 "D"

4.5 "E"

4.6 "F"

5. As you trace the execution of the program below, write its printed outputs in the order in which they appear in a comma-separated list.

```
1 export let main = async () => {
2   let x = foo(5);
3   print("x_is_ " + x);
4 };
5 let bar = (a: number): number => {
6   print("sup");
7   return fun(a);
8 };
9 let foo = (num: number): number => {
10  print("ay");
11  let y = bar(num + 1);
12  print("jeffrey");
13  return y;
14 };
15 let fun = (jif: number): number => {
16  print("!");
17  return jif ** 2;
18 };
19 main();
```

6. For each of the following questions, indicate whether each variable from the program on the left can be printed on the line specified by replying either "yes" or "no".

6.1 y on line 10

6.3 x on line 6

6.2 num on line 12

6.4 a on line 16

7. Consider the reduce function below as you respond to the following questions.

```
1 let reduce = (arr: number[]): number => {
2   let sum = 0;
3   for (let i = 0; i < arr.length; i++) {
4     sum = sum + arr[i];
5   }
6   let a = sum / arr.length;
7   return a;
8 };
```

7.1 What is returned by the function call `reduce([1, 5, 4, 6])`?

7.2 What is the purpose of `reduce`? I.e., how do the values in the input array `arr` relate to the function's return value?

8. In the box below, write a function named `countFives` that takes in a `number[]` named `arr` and returns a `number`. The number returned should be the number of occurrences of the number 5 in `a`. For example, `countFives([1, 2, 3, 4, 5])` should return 1. Note: your implementation must include a for loop.

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4 let funk = (arr: number[]): number[] => {
5   for (let i = 0; i < arr.length; i++) {
6     if (arr[i] > 5) {
7       arr[i]++;
8     } else {
9       arr[i]--;
10    }
11  }
12  return arr;
13 };
14 let foo = (nums: number[]): number[] => {
15   let i = 0;
16   while (i < nums.length) {
17     nums[i] += i;
18     i++;
19   }
20   return funk(nums);
21 };
22 main();

```

1.1 A variable named `i` is declared on both lines 5 and 15, yet the program does not generate an error. Why? **Their scopes do not overlap. The `i` declared on line 6 has a scope limited to the for loop that ends on line 12, while the `i` declared on line 16 will only be recognized within `foo`.**

1.2 Fill the boxes with the values stored in `x` after the program completes.

10	4	8	7	7
0	1	2	3	4

2. Write in an expression or term for each of the questions below.

2.1 The special variable declarations that are placeholders for the inputs a function needs are called:

parameters

2.2 The valid code expression to access the length of a string array named `arr` is:

arr.length

2.3 The last index of an array `arr` is always (represent this in terms of the length of `arr`):

arr.length - 1

3. Using the code listing below, identify the printed output. If multiple things are printed, separate them with commas.

```

1 let s = ["h", "i", "y", "a"];
2 let r = "";
3
4 for (let b = s.length - 1; b >= 0; b--) {
5   r = s[b] + r;
6 }
7 print(r);

```

hiya

4. Fill in each box with a function call that will return the specified value. If the specified value is logically unreachable, write "n/a". (hint: one of them is unreachable). Note that, for all reachable return values, there are many possible correct responses. The first one is completed for you.

```

1 let foo = (x: number): string => {
2   if (x % 3 === 0) {
3     return "A";
4   } else {
5     return "B";
6   }
7 };
8 let bar = (y: number, z: number): string => {
9   if (y + z > y) {
10    return "C";
11  }
12  return "D";
13 };
14 let funk = (a: number): string => {
15   if (a * 2 % 2 === 0) {
16     return "F";
17   }
18   return "E";
19 };

```

4.1 "A"

foo(3)

4.4 "D"

bar(3, -4)

4.2 "B"

foo(4)

4.5 "E"

n/a

4.3 "C"

bar(3, 4)

4.6 "F"

funk(3)

5. As you trace the execution of the program below, write its printed outputs in the order in which they appear in a comma-separated list.

ay, sup, !, jeffrey, x is 36

```
1 export let main = async () => {
2   let x = foo(5);
3   print("x is " + x);
4 };
5 let bar = (a: number): number => {
6   print("sup");
7   return fun(a);
8 };
9 let foo = (num: number): number => {
10  print("ay");
11  let y = bar(num + 1);
12  print("jeffrey");
13  return y;
14 };
15 let fun = (jif: number): number => {
16  print("!");
17  return jif ** 2;
18 };
19 main();
```

7. Consider the reduce function below as you respond to the following questions.

```
1 let reduce = (arr: number[]): number => {
2   let sum = 0;
3   for (let i = 0; i < arr.length; i++) {
4     sum = sum + arr[i];
5   }
6   let a = sum / arr.length;
7   return a;
8 };
```

8. In the box below, write a function named `countFives` that takes in a `number[]` named `arr` and returns a `number`. The number returned should be the number of occurrences of the number 5 in `a`. For example, `countFives([1, 2, 3, 4, 5])` should return 1. Note: your implementation must include a for loop.

```
1 let countFives = (a: number[]): number => {
2   let numFives = 0;
3   for (let i = 0; i < a.length; i++) {
4     if (a[i] === 5) {
5       numFives++;
6     }
7   }
8   return numFives;
9 };
```

6. For each of the following questions, indicate whether each variable from the program on the left can be printed on the line specified by replying either "yes" or "no".

6.1 y on line 10

No

6.3 x on line 6

No

6.2 num on line 12

Yes

6.4 a on line 16

No

7.1 What is returned by the function call `reduce([1, 5, 4, 6])`? 4

7.2 What is the purpose of `reduce`? I.e., how do the values in the input array `arr` relate to the function's return value? **The return value is the numerical average of the numbers in the input array `arr`.**