Standard 7 – Arrays

1. Write a single line that creates an array/list of numbers 1-10 called nums.

```
int[] nums = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
```

2. Write a single line of code that returns the count of elements in the nums array/list.

```
System.out.println("Elements in array: " + nums.length);
```

3. Write a line of code that changes the value of the third position in nums from 3 to 30.

```
nums[2] = 30;
```

4. Java only: Describe the difference between an array and arraylist.

An array has a fixed size and cannot be changed, while the size of an arraylist can be changed. An arraylist has more functions than arrays.

5. Write code that searches nums array for the value 5.

```
for (int i = 0; i < nums.length; i++) {
    if (nums[i] == 5) {
        System.out.println("A 5 has been found at element " + i + "!");
    }
}
```

6. Write an example of populating nums with values 1-10 in a for loop.

```
int[] nums = new int[10];

for (int i = 0; i < 10; i++) {
    nums[i] = i + 1;
}
```

7. Write code to set “this is my string” to a new string called myString.

```
String myString = new String("This is my string");
```

8. Print myString by its identifier followed by the text “ and strings are cool.”

```
System.out.println(myString + " and strings are cool.");
```

9. How do you get the count of characters in myString?

```
System.out.println(myString.length());
```

10. How would you remove the letter ‘g’ in myString?

```
for (int i = 0; i < myString.length(); i++) {
    if (myString.charAt(i) == 'g') {
        myString = myString.replace("g", "");
        System.out.println(myString);
    }
```

Standard 8

1. Assume you have a newly created class called Spaceship, now instantiate 10 empty data objects of Spaceship in an array called myShips.

```
Spaceship[] myShips = new Spaceship[10];
```

2. Assume that Spaceship has a public method called “shoot.” Show how you would call the method in code.

```
myShips[1].shoot();
```

3. Rather than setting Spaceships’s length directly, show how you would set the length of a private int called sLength.

```
private int sLength = 10;
Spaceship[] myShips = new Spaceship[sLength];
```

4. Show what a constructor would look like in Spaceship that sets its color to red and its max speed to 10.

```
Spaceship(color c, int speed) {
    this.c = c;
    this.speed = speed;
}

Spaceship spaceship = new Spaceship(#ff0000, 10);
```

5. Write a public method for Spaceship called getShipArea that would return its length times its height.

```
public int getShipArea() {
    int shipArea = shipLength * shipHeight;
    return shipArea;
}
```

6. Java and C++ only: Describe the modifiers public vs. private and why they are used in programming.

The public and private modifiers change the scope of things. Public makes them accessible anywhere, while private makes them accessible to only their own class.

Modifiers are important to encapsulation in OOP.

Standard 9

1. Write a line of code that would make the file “myTextFile.txt” available in an application.

```
File file = new File("myTextFile.txt");
```

2. How would you append the file with the value “more text”?

```
PrintWriter pw = new PrintWriter(new FileWriter(outputFile, true));
pw.println("more text");
pw.close();
```

3. Print the contents of the file “myTextFile.txt” to the console.

```
Scanner fileScanner = new Scanner(inputFile);
while (fileScanner.hasNextLine()) {
    System.out.println(fileScanner.nextLine());
}
```

Computer Programming 1B

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# of Questions										

STANDARD 6 Students will develop an awareness of career opportunities in the Computer Programming/Software Engineering industry and of its history.

Objective 1: Identify personal interests and abilities related to Computer Programming/Software Engineering careers

1. Identify personal creative talents
2. Identify technical/programming talents
3. Identify organizational and leadership skills
4. Explore aptitude for innovation
5. Determine aptitude for working as a member of a computer programming/software engineering team

Objective 2: Investigate career opportunities, trends, and requirements related to computer programming/software engineering careers

1. Identify the members of a computer programming/software engineering team: team leader, analyst, senior developer, junior developer, and client/subject matter expert
2. Describe work performed by each member of the computer programming/software engineering team
3. Investigate trends associated with computer programming/software engineering careers
4. Discuss related career pathways.
5. Compile a portfolio of the individual and group programs developed during the course

Objective 3: Discuss relevant history of software development

1. Discuss relevant history of computer technology
2. Identify key points in the history of the computer programming/software engineering industry

STANDARD 7: Students will employ arrays.

Objective 1: Demonstrate the ability to use arrays in programs.

1. Declare arrays all applicable types.
2. Initialize arrays.
3. Input data into arrays.
4. Output data from arrays.
5. Perform operations on arrays.
6. Perform sequential searches on arrays.

Objective 2: Demonstrate the ability to use dynamic arrays (i.e. vectors, arraylists, or generic lists)

1. Declare a dynamic array
2. Add and remove items from the array
3. Output data from arrays.
4. Perform operations on arrays.
5. Iterate through the loop (i.e. foreach loop)

Objective 3: Demonstrate the ability to use strings in programs.

1. Compare string identifiers.
2. Find the length of a string.
3. Copy part or all of string identifiers into other strings.
4. Concatenate string identifiers.
5. Locate and delete sub-string positions.

Using utahfuturs.org, list the following for a job of your choice within the list below:

6.1 mid career income range in SL county
6.2 school/training required
6.3 typical work activities
6.4 two companies posting relevant jobs within the state

7.1 Write a single line that creates an array/list of numbers 1-10 called nums.
7.2 Write a line of code that returns the count of elements in the nums array/list.
7.3 Write a line of code that changes the value of the third position in nums from 3 to 30.
7.4 Java Only: describe the difference between an array and an arraylist (vector is obsolete).
Python Only: describe the functions and differences between a tuple, list and dictionary
_ hint: mutable vs. immutable).
C++ Only: describe the difference between an array and a vector.
7.5 Write code that searches the nums array for the value 5.
7.6 Write an example of populating nums with values 1-10 in a for loop.
7.7 Write code to set “this is my string” to a new string called myString.
7.8 Print myString by its identifier followed by the text “ and strings are cool.”
7.9 How do you get the count of characters in myString?
7.10 How would remove the letter ‘g’ in myString?

STANDARD 8: Students will properly employ object-oriented programming techniques. **Objective 1: Demonstrate the ability to use classes.** 1. Instantiate objects. 2. Use object data members. 3. Use object member functions (methods). **Objective 2: Demonstrate the ability to create user-defined classes.** 1. Create and use data members. 2. Create a constructor to initialize the data members. 3. Create and use instance functions (methods). **Objective 3: Demonstrate proper design principles with classes** 1. Create classes that are well encapsulated (data members private). 2. Properly use modifiers and accessors (getters and setters). 3. Understand private and public modifiers	8.1 Assume that you have a newly created class called Spaceship, now instantiate 10 empty data objects of Spaceship in an array called myShips. 8.2 Assume that Spaceship has a public method called "shoot" show how you would call the method in code. 8.3 Rather than setting the Spaceship's length directly, show how you would set the length of a private int called sLength. 8.3 Show what a constructor would look like in Spaceship that sets its color to red and its max speed to 10. 8.4 Write a public method for Spaceship called getShipArea that would return its length times its height. 8.5 (Java and C++ Only) Describe the modifiers public vs. private and why they are used in programming.
STANDARD 9: Students will properly use sequential files. **Objective 1: Demonstrate the ability to use sequential files in programs.** 1. Create and initialize sequential files. 2. Store data to sequential files. 3. Retrieve data from sequential files. 4. Update sequential files.	9.1 Write a line of code that would make the file "myTextFile.txt" available in an application. 9.2 How would you **append** the file with the value "more text" 9.3 Print the contents of the file "myTextFile.txt" to console.
STANDARD 10: Students will apply appropriate programming skill as an effective member of a team. **Objective 1: Demonstrate the ability to apply knowledge to a programming project.** 1. Formalize specifications. 2. Choose proper input parameters. 3. Choose appropriate data structures and processing. 4. Design appropriate output. 5. Use appropriate test data. 6. Write good documentation. **Objective 2: Demonstrate the ability to use teamwork and collaboration in a programming project.** 1. Divide a project among programmers. 2. Present work to a group. 3. Coordinate work with others in the group. 4. Complete assigned work according to predetermined deadlines. 5. Participate in a peer performance evaluation. Demonstrate professionalism in team relationships, communication, timeliness, and attitude.	