

COSC 201 Review Questions  
Midterm  
Fall 2017

- 1.) Write the code to create an enhanced for loop that will go through every member of an ArrayList <String> myArray and print it out to the console.
- 2.) Give the code to create an array of strings of size 10 called myStrings.
- 3.) What is the difference between Object and Class?
- 4.) Give an algorithm to solve the maximum subsequence sum problem in less than  $O(n^3)$  time.
- 5.) Give the code to create a class called Student that IS-A Person. The class Student should have one field a double called gpa. Be sure to create the constructor, toString, accessors and mutators for Student. The constructor will take in 5 parameters: String n, int ag, String ad, String p, double g and assume that the constructor for Person is formatted: Person(String n, int ag, String ad, String p).
- 6.) What is an IS-A relationship?
- 7.) Give the code to create an interface called myInterface. The interface should have two methods, add and remove. Add has two parameters, int a and int b. Remove has one parameter, int idx.
- 8.) Give the code to implement an interface called Whee. Whee's interface definition:

```
public interface Whee{  
    public int add2ints(int a, int b);  
}
```

Your implementation of this interface should include simply the methods needed.

- 9.) Define algorithm analysis.
- 10.) What is the time complexity of this snippet of code:

```
for (i = 0; i < n; i++)  
    for (j = 0; j < n; j++)  
        for (k = 0; k < n; k++)  
            System.out.println(k*i*j);
```

- 11.) Give the code to create an Iterator for the ArrayList myArray. Use that Iterator to print out the elements in myArray.

- 12.) What is the interface for Iterator?
- 13.) Name 5 of the 8 primary methods in the Collection interface.
- 14.) What is recursion?
- 15.) Give the recursive method for the summation of integers from 1 to N.
- 16.) Give the recursive method to find the Fibonacci sequence number at a given index  $i$  (i.e. the  $i$ th number in the sequence).
- 17.) Given the following set of number  $\{1, -4, 3, 2, 12, -8, -9, 18\}$ , what is the maximum contiguous subsequence sum for said set?
- 18.) Create an abstract class called Person. The class should include name, age and address. Include the usual methods (constructors, getters, setters) and an abstract method toString.
- 19.) Give the code to determine if a variable **myvar** is of type Integer.
- 20.) Give the code to print out the command line arguments in a main method. Be sure to include any error checking you may need.
- 21.) What is polymorphism?
- 22.) Will the following code snippet work?

```
Student s = new Student(...);
Person p = s;
p.getName();
p.getGPA();
```

Assume that Person has an implementation of getName, but not an implementation of getGPA. If this does not work, how can I use **p** to call getGPA?
- 23.) If I wanted to create a class that is generic, but restricted to include only types that extend Person, what would the class signature look like?
- 24.) Is LinkedList in Java doubly or singly linked?
- 25.) What's the difference between Iterator and ListIterator?
- 26.) Create a PriorityQueue of Strings. Add the following Strings to the queue: "Alan", "COSC 201", "Computer", "Science", "Schaefer", "SMCM". If we printed out this queue in order of access, what would print?

- 27.) Provide the pseudocode for the add method for a doubly-linked LinkedList, adding an element to a LinkedList at index i. You should consider and handle all error cases and assume the following about the classes:

**Node Class:**

```
AnyType data;  
Node prev;  
Node next;  
Node(AnyType d) //constructor
```

**LinkedList Class:**

```
Node head;  
Node tail;  
int size;
```

- 28.) Declare and instantiate an Integer queue in Java. Add the following numbers to the queue: 1, 4, 22, -4, 3, 1. If we printed the queue out in order of access, what would print?
- 29.) Stacks and Queues are characterized by their access order. One is LIFO and one is FIFO. Which is which?
- 30.) Declare and instantiate an Integer stack in Java. Add the following numbers to the stack: 1, 4, 22, -4, 3, 1. If we printed the stack out in order of access, what would print?