ICS4UI Midterm 1 28 October, 2016

Write an if-statement that prints "yes" if the point (*x, y*) is either on the positive *y*-axis or on the positive y-axis, and prints "no" otherwise. Assume that *x* and *y* already have values.

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| --- |
| if ( x==0 && y>0 || y == 0 && x > 0 )  println("yes");  else  println("no"); |

Declare a 1-D array named *drSeussBooks* that can store 50 Strings.

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| --- |
| String[] drSeussBooks = new String[50]; |

Write some code that fills the first two items in *drSeussBooks* with the Strings "The Lorax" and   
"Green Eggs & Ham", and then fills the last item in the array to "Red Fish Blue Fish".

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| --- |
| drSeussBooks[0] = "The Lorax";  drSeussBooks[1] = "Green Eggs & Ham";  drSeussBooks[49] = "Red Fish Blue Fish"; |

Declare a 2-D array named *myData* that can store a 10 x 8 table of decimal values.

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| --- |
| float[][] myData = new float[10][8]; |

Write code that fills *myData* with random values between 0 and 1.

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| --- |
| for(int i = 0; i < 10; i++)  for(int j = 0; j < 8; j++)  myData[i][j] = random(0, 1); |

Write code that counts how many items in the last 3 columns of *myData* are larger than 0.75.

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| --- |
| int count = 0;  for(int i = 0; i < 10; i++ )  for(int j = 5; j < 8; j++ )  if( myData[i][j] > 0.75 )  count++; |

Declare an empty ArrayList of Strings named *myHobbies*.

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| --- |
| ArrayList<String> myHobbies = new ArrayList<String>(); |

Write code that adds the words "chess" and "dance" to *myHobbies*, and then prints the statement,  
"The list now has \_\_\_ items in it", where the \_\_ is filled with the correct value*.*

|  |
| --- |
| myHobbies.add("chess");  myHobbies.add("dance");  println("The list now has " + myHobbies.size() + " items in it." ); |

Complete these method headers.

|  |
| --- |
| boolean isPrimeNumber( int x )  float getArea( Polygon p )  void printLastName( String fullName )  String getQuadrant( float x, float y ) //Example: getQuadrant(3, -5.6) returns "Quadrant IV"  void drawMandelbrotSet()  int numFailures( int[] marksArray ) //Example: numFailures( {60, 49, 90, 35, 80}) returns 2  String[] get3Rhymes( String word ) //Example: get3Rhymes("pat") returns the array {"bat", "cat", "sat"}  Fraction getReciprocal() //Example: Fraction f = new Fraction(2, 5); Fraction g = f.getReciprocal(); |

Write a function named *getTotalSeconds* that takes a stopwatch time as a parameter and returns the total number of seconds represented by that time. The stopwatch time should be a String.   
Examples: getTotalSeconds( "3:40" ) returns 220, and getTotalSeconds( "0:05" ) returns 5.

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int getTotalSeconds(String t) {

int colonIndex = t.indexOf(":");

int minutes = parseInt(t.substring(0,colonIndex));

int seconds = parseInt(t.substring(colonIndex+1));

return minutes\*60+seconds;

}

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

Write some code that reads a list of stopwatch times from a file named *SJAM Junior Girls CC Meet.txt* and calls the function getTotalSeconds on each one, and outputs the results to a second file named named *SJAM Times In Seconds.txt.*

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

String[] times = loadStrings("SJAM Junior Girls CC Meet.txt”);

PrintWriter pw = createWriter(“SJAM Times In Seconds.txt”);

for( int i = 0; i < times.length; i++) {

int numSeconds = getTotalSeconds( times[i] );

pw.println(numSeconds);

}

pw.close();

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Write the constructor for this class. Assume that a movie has not been watched when it is first created.

class Movie {

String title;

int starRating;

int numTimesWatched;

Movie(String t, int s) { //only 2 parameters (s and t) are needed, since numTimesWatched is automatically set to 0

this.title = t;

this.starRating = s;

this.numTimesWatched = 0;

}

//don’t code these yet

void watch() {…}

void displayInfo() {…}

}

Write a line of code that creates a Movie object named *theMartian* with title "The Martian" and a rating of four stars.

|  |
| --- |
| Movie theMartian = new Movie("The Martian", 4); |

Suppose you watch The Martian twice. Write some code to indicate this.

|  |
| --- |
| theMartian.watch();  theMartian.watch(); |

Write some code that creates an empty ArrayList named *bestMovies* of type Movie, and then adds the Movie object you created above to the ArrayList.

|  |
| --- |
| ArrayList<Movie> bestMovies = new ArrayList<Movie>();  bestMovies.add( theMartian ); |

Suppose the ArrayList *bestMovies* now contains several Movie objects , and that some of the movies in it have been watched and others haven't. Write some code that counts how many movies in *bestMovies* have been watched.

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int numMoviesWatched = 0;

for(int i=0; i<bestMovies.length; i++){

if( bestMovies.get(i).numTimesWatched > 0 ){

numMoviesWatched ++;

}

}

Note: if bestMovies were an array instead of an ArrayList, we’d say **if (bestMovies[i].numTimesWatched > 0) {**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

Final task! Are you up for the challenge? Assume the ComplexNumber class has already been written. Write a setup() program that:

* Creates two empty arrays of ComplexNumber objects named listA and listB
* Fills both arrays with random complex numbers
* Multiplies every number in listA with every number in listB, and stores the results in a 2-D array named productsOfAB

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ComplexNumber[] listA = new ComplexNumber[10]; //or any size you want

ComplexNumber[] listB = new ComplexNumber[20]; //or any size you want

for(int i = 0; i < listA.length; i++) {

float a = random(-5, 5); //or any ranges you want

float b = random(-5, 5);

listA[i] = new ComplexNumber(a, b);

}

for(int j = 0; j < listB.length; j++) {

float a = random(-5, 5); //or any ranges you want

float b = random(-5, 5);

listB[j] = new ComplexNumber(a, b);

}

ComplexNumber[][] productsOfAB = new ComplexNumber[ listA.length ][ listB.length ];

for(int i = 0; i < listA.length; i++) {

for(int j = 0; j < listB.length; j++ ) {

productsOfAB[i][j] = listA[i].multiply( listB[j] ); //why can’t we just say listA[i]\*listB[j]?

}

}

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