CSE1325 OOP Midterm

October 21, 2014

Name: UTA ID: 100

Instructions:

1. Read all of the instructions for each question and answer what is asked. Do not write down random stuff if you don’t know the answer.
2. All questions that have the same question number are related to each other. However, they are not all necessarily dependent on each other so you can skip around if needed.
3. The test is worth 100 points and there will be 10 points extra credit available.
4. If you have a question during the test, raise your hand and ask the proctor. You may or may not get an answer, but you won’t know unless you ask.
5. Check for bonus questions.

1. Draw a diagram of a GUI that shows at least two meaningful labels, at least one text field, and at least three mutually exclusive radio buttons. The GUI must make sense as an window to the user, i.e. the GUI window must have labels and choices that accomplish some understandable task. (It can be a silly task but it must be understandable.) {12 points}

Blue water

Blue sky

2. Write a few lines of Java code to set up an input stream from a file named “inputdata.txt” {8 pts}

File infile = new File(“inputdat.txt”);

Scanner input = new Scanner(infile);

3. Given the classes on the last pages of the test (MTF14 and MTF14Test) answer the following questions:

3.a. Can an MTF14 object be constructed with no input parameters? Briefly explain your answer.

{4 pts}

No, because it does not have a constructor defined that has that pattern. You could write such a constructor though.

3.b. Does the MTF14 class demonstrate any polymorphism? If yes, explain how. If no, write some code that could be added to the class to create an example of polymorphism. {6 points}

Currently no polymorphism is demonstrated.

An easy way to include it is to write a second constructor which takes in different inputs. An example is

public MTF14(i) {

setaC3(LOCAL);

setExC3(EXC);

setLn4(LINE);

}

3.c. Briefly explain why prAL is a private method. {4 pts}

Because it prints the arraylist of MTF14 as output and the arraylist is only used by the test class

3.d. What task is handled by the last line of code in the toString function of MTF14? Describe what is being done in words. {4 pts}

The final line determines how many leading zeros need to be printed

3.e. If the main routine had the following lines

vals.add(new MTF14(611, 133, 96));

System.out.println(“Saved: “+vals.get(index++)); //assume the value of index will be correct

What will be printed for the output of these two statements? {6 pts}

817-272-2100

3.f. Assuming that you have determined what MTF14 represents in the real world, give an example of values that work for this type of object in the real world but would not work in MTF14. Explain why your example will not work in the MTF14 class. {5 pts}

888 – 694-6931

would not work because the “88” pattern will be caught

4. Write a Java class to represent information about a course at UTA that you might sign up for. Your class should include 1) data to represent the department that teaches the class using the two, three, or four letter code (ex. EE, MATH, CSE, etc.), 2) the four digit course number, 3) the class days, 4) the starting time of the class, 5) the ending time, 6) the instructor’s last name, 7) the three digit section number, 8) a boolean to indicate if it is a pre-professional course in a major, 9) an average grade of all students taking the class with this instructor measured on a 4.0 scale, 10) the maximum number of students in the section, 11) the building abbreviation (one of NH, WH, ERB, or ELB), and the 12) room number.

You must write SOME of the methods for this class. The methods you must write include 1) a constructor to make an empty course object, 2) a constructor with all data passed in, 3) getter and setters for the a) course number, the b) building abbreviation, the c) pre-professional boolean, the d) average grade value, and the e) maximum number of students in the section, and 4) a toString method to print all of the data for the course. {20 points}

[Use the backs of pages if more space is needed.]

enum EngBldg { NH, WH, ERB, ELB }

public class utaCourse

{

private char[4] department; // array of letters; can be other representations

private int courseNum; // integer course number to error check; can be other representation

private char[5] courseDays; // array of letters representing days; can be other representations

private float startTime; // hh.mm ; can be other representations

private float endTime; // hh.mm ; can be other representations

private String instructor;

private int sectionNum; // integer number to error check; can be other representation

private boolen preProfessional ;

private double avgGrade; // must be error checked, can be float

private int maxStudents;

private EngBldg building; // enum or other rep

private int room; // integer number to error check; can be other representation

public utaCourse()

{

}

public utaCourse (char[4] dt, int cN, char[5] cD, float sT, float eT, String in, int sN, boolean pP, double aG, int mS, EngBldg bu, int rm)

{

}

public String toString()

{

}

5. Draw lines to connect the words in the left column to the appropriate word or phrase in the right column. Only one line should connect from any word or phrase. If more than one phrase seems possible, choose the word or phrase that fits the best. {5 points}

implements allocate memory for

extends ActionListener

instantiate partial implementation

abstract superclass

register interface

6. If some new class is created that uses a collection class and the new class can take the input of this set of letters in this order:

H L G J Y D M I E Z K

and the new class can generate output that looks like the data below, what kind of collection class is most likely being used? Explain why you believe this collection class is being used. {4 pts}

H

(G L)

(D - )(J Y)

(- E)( - - )(I K)( M Z)

TreeSet collection because looks like a binary tree created from the unsorted list above.

7. Describe in your own words the difference between designing a program in a traditional structured/procedural way and designing a program in an object-oriented way. {5 pts}

Should include focus on data vs. actions;

Could include

security with access specifiers and encapsulation;

reusability

portability

8. Fill in the blanks

8.a. “Creating a variable of a given type” for a structured programming language would be stated as

\_\_Instantiating\_\_\_\_\_ a/n \_\_\_\_\_object\_\_\_\_\_ of a given \_\_\_\_class\_\_\_ for an object-oriented language. {6 points}

8.b. Connecting a method for handling events to a Java Swing component button would be called

\_\_\_Registering\_\_\_ a/n \_\_\_\_\_ActionListener\_\_\_\_\_\_ for a given \_\_\_JButton\_\_\_\_.

{ Any handler or listener name is accepted) {6 points}

9. Write an interface named *Prioritize* that has a method called *determinePriority*. The method *determinePriority* should accept two integers as input. {5 points}

public interface Priority {

public int determinePriority(int pr, char code);

}

Extra Credit questions

XC1.a. Using MTF14 again, what default values will be given if aC3, exC3, and ln4 are all invalid and what do these values represent? {4 pts}

aC3 = 817

exC3 = 272

ln4 = 2011

817 272 2011 is the number for the UTA switchboard.

XC1.b. Explain in words what the test below is checking:

((aC3 % 10) == ((aC3 / 10) % 10) {4 pts}

The test is from the earlier example and looks at the 3-digit value aC3. Given the three digit value, this test takes the third (one’s place) digit (aC3 % 10) and compares it to the second digit from((aC3/10) % 10). (aC3/10) removes the third digit - reducing the whole number by dividing by 10 - then the remaining two digit number (the original first and second digit) have modulo 10 applied to them which leaves only the one’s place digit. The test then takes the original third digit and tests to see if it is equal to the second digit.

XC2. What course would you take at UTA just for fun (assuming it was free and you had the time)?

{Any meaningful answer will receive 2 points. ANY answer will receive at least 1 point.)