CMPUT 301 2018 Fall Midterm
TEST VERSION: Pikachu

Name:_____

CCID:_____

Student Number:_____

Question	Mark	Out of
Object Oriented Analysis & Design		3
Process & OO		3
Sequence Diagram		3
UML to Code		3
Cohesion and Coupling		3
TOTAL		15

Name:_____

CCID:_____

Object Oriented Analysis and Design: Classes and Methods [3 marks]

Engage in Object Oriented Analysis and read the following scenario paragraph and pull out potential *nouns* that may lead to classes and *verbs may lead to methods or relationships*. **Draw a well-designed UML class diagram** to represent this information. Provide the basic abstractions, attributes, methods, relationships, multiplicities, and navigabilities as appropriate.

I want to make a web forum with threaded discussions. Commentators can post a new comment, with a subject and text-body, and commentators reply by creating new comments in reply to the original comment. For instance I will make a new comment called "I will be proctoring the CMPUT301 midterm", and TA Abdul will reply with a comment asking, "Do I have to proctor?". I will then will reply to his comment with a comment saying, "No."

CMPUT 301 Fall 2018 Midterm

Name:_____

CCID:_____

Process & OO [3 marks]

1 mark What OO design rule does this code violate? Why does it violate it?

```
// interface for a dynamically growing List
public interface List {
    // how many objects are in the list
    public int getLength();
    // a new object to the end of the list
    public void append(Object o);
    // get the i-th object (0 indexed)
    public Object get(int i);
}
```

```
public class QuadList implements List {
    private index = 0;
    Object[] objects = new Object[4];
    public int getLength() { return 4; }
    public void append(Object o) {
        // modulus (% 4) wraps index between 0 to 3
        objects[index % 4] = o; // % is modulus
        index++;
    }
    public Object get(int i) {
        return objects[i % 4]; // % is modulus
    }
}
```

1 mark On CRC cards and user stories we can annotate them with test cases. **Annotate** this user story with a manually verifiable and specific test case.

Scenario: I need to find a certain kind of yellow. I type in banana, and a bunch of examples show up. I click on a milder yellow and it is called "banana mania".

User story: As a color searching user, I want to search for colors by keyword.

Provide a Verifiable test case:

1 mark TravisCI, a continuous integration suite, just told me that my branch "**cookies**" built and passed all of the tests. I successfully pushed my repo's branch "**cookies**" to my team's shared repository. I've now checked out my team's share repository master branch. How do I now share the changes from the branch "**cookies**" with the current branch master using the git commandline interface (*what git command!*) ?

CMPUT 301 Fall 2018 Midterm

Name:_____

CCID:_____

Sequence Diagram: [3 marks]

Convert this scenario or part of it into a single **UML Sequence Diagram** related to weather reports for a journey. Remember to include of all the actors. You can use the back of the page if you need space.
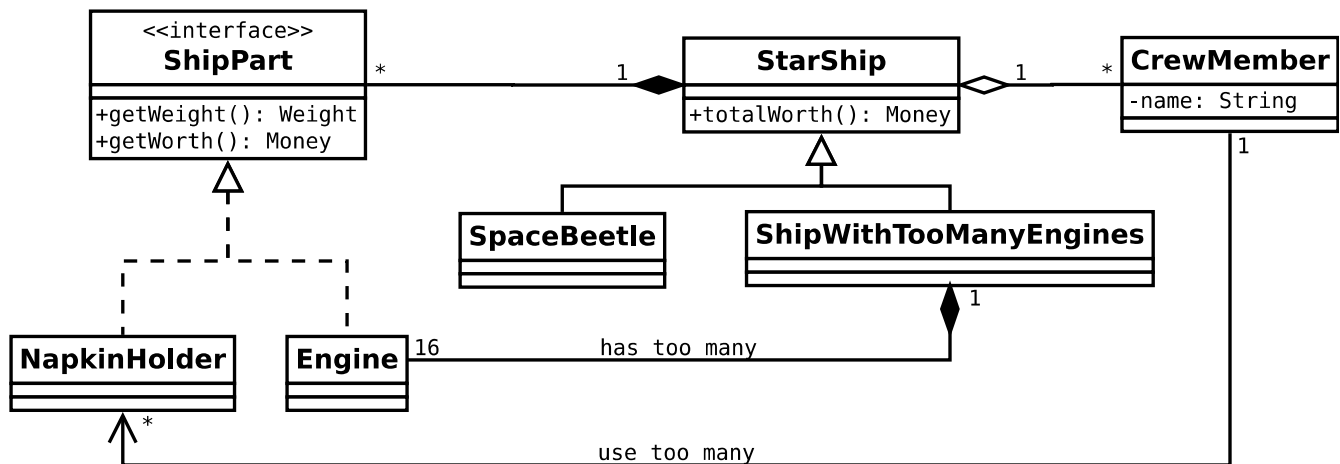
Scenario: Weather reports for a journey.

I will be driving from Edmonton to Saskatoon today and I want a report of the weather I will face if I start driving at 1pm. So I start the weather journey app. I enter the start, Edmonton, as text. I enter the end of my journey, Saskatoon, as text. It shows me 3 routes. I choose the first route that takes highway 16. It asks me what time and date I am starting. I choose 1pm today. It goes and queries weather.gc.ca for the weather along my journey. Then it shows me a report of weather per hour and location along my journey.

CMPUT 301 Fall 2018 Midterm

Name:_____

CCID:_____

UML to Code: [3 marks]

Convert this class diagram of a Space Trading game to skeletal Java Code. Include all attributes and obviously public methods. Make sure all required methods are implemented. Includes all generalizations and necessary associations. If you need space feel free to use the back of the page.

```
<<interface>>
ShipPart                                    StarShip              CrewMember
                       *              1                    1    *
+getWeight(): Weight                   +totalWorth(): Money      -name: String
+getWorth(): Money                                                           1

                                          SpaceBeetle   ShipWithTooManyEngines

                                                                      1
NapkinHolder        Engine  16        has too many

                 *                    use too many
```

Name:_____

CCID:_____

Cohesion and Coupling [3 marks]

Based on these classes answer questions about cohesion and coupling:

```
class UserPreferences {
   static private UserPreferences
instance;
   Font preferredFont;
   GeoLocation userLocation;
   Color favoriteColor;
   ...
}
class Point2D {
   int x;
   int y;
   Point2D add(Point2D p) {...}
   ...
}
public class X extends Y {
   public Y y(Y y) { ... }
   public Z z(Z z) { ... }
   public int hashCode() { ... }
   ...
}
```

```
class LettuceMonster extends
      Monster {
   Lettuce[] lettuceParts;
   Sprite getSprite() { ... }
   Damage calculateDamage(Attack a) { ...
}
   ...
}
class Relationship {
   Set<User> users;
   String explanation;
   ...
}
class Classroom {
   Tuple<Course,DateTime>schedule;
   List<Student> attendance(DateTime d){
    ...
   }
   boolean available(DateTime d){...}
   ...
}
```

Given the above classes which class is the **most** *cohesive*:_____

Given the above classes which class is the **least** *cohesive*:_____

Given the above classes which class is the **most** *coupled*:_____

Given the above classes which class is the **least** *coupled*:_____