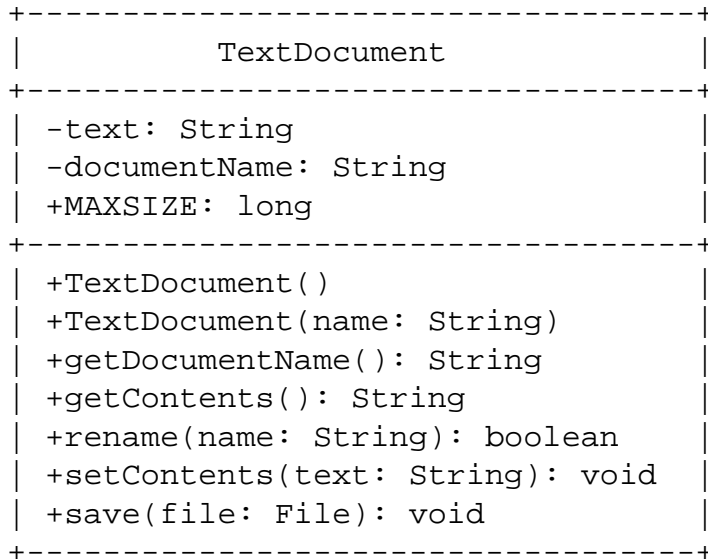




[May use all sides of an 8.5 × 11 inch sheet of paper] Show all of your work clearly in the space provided or on the additional page at the end of the exam. If the additional page is used, clearly identify to which exam question it is related. Be sure to **read each problem carefully**. Note that the exam is double sided. Due to time constraints, you are not required to document your source code.

1. (10 points) List two distinctly different things that can be done with an `if` statement that cannot be done with a `switch` statement.

2. (20 points) Write the `TextDocument.java` file for the `TextDocument` class described by the following UML diagram:



You should write the complete `TextDocument.java` class file except you should leave all of the method bodies empty.
Place answer on next page.



Answer to problem 2 goes here:



3. (20 points) Implement the `getContents` and `setContents` methods from `TextDocument` class in question 2.

4. (25 points) The probability that an individual telephone call will last less than t minutes can be approximated by the exponential probability function:

$$\text{probability that a call lasts less than } t \text{ minutes} = 1 - e^{-t/a}$$

where a is the average length of a call and $e = 2.71828$ (Euler's number). For example, assuming that the average call length is 2 minutes, the probability that a call lasts less than 1 minute is calculated as $1 - e^{-1/2} = 0.3297$.

Using this probability function, write a Java program that asks the user to enter an integer value, x , and displays the probabilities of a call lasting less than 1 to less than 500 minutes, in x minute increments. You should assume that the average call length is 2.8 minutes.

Hint: In the `java.lang.Math` class is a `static` method (called `exp` which "Returns Euler's number e raised to the power of a `double` value." The method accepts a `double` value and returns a `double`.

```
// imports here
```

```
public class Exam2Prob4 {  
    public static void main(String [] args) {
```

```
    }  
}
```

5. (25 points) Write a program that asks the user to enter an integer value between 5 and 20 (not including 5 or 20). If the user enters a valid value, the program should display “thanks.” If the user enters an invalid value, the program should continue to ask the user to enter a valid value until they do.

```
// imports here
```

```
public class Exam2Prob5 {  
    public static void main(String [] args) {
```

```
    }  
}
```



Additional work area for any problem. Clearly identify to which problem the work on this page is related.



Additional work area for any problem. Clearly identify to which problem the work on this page is related.