

## 5. Exceptions and Generics

- (a) Exceptions can be used in the Java programming language to allow programmers to detect and gracefully handle errors.
- Explain the difference between *checked* and *unchecked* exceptions. Define two exception classes, a checked exception called `ParseException` and an unchecked exception called `PrintException`. A single constructor method for each will be sufficient. [5]
  - You are using the following code in your application:

```
public class UtilFunctions {  
    public static int stringToInt(String input)  
        throws ParseException {  
        ...  
    }  
    ...  
}
```

Describe, with an example how you would use the `stringToInt` function in your code. [3]

- (b) Describe the main motivating factors behind using Generics in the Java programming language. [4]
- (c) Rewrite the following data structure using Java generics (You may ignore any potential errors that result from exceeding the size of the array). [4]

```
public class Array {  
    private Object[] values;  
    private int counter;  
    public Array(int size) {  
        values = new Object[size];  
        counter = 0;  
    }  
    public void add(Object o) {  
        values[counter++] = o;  
    }  
    public Object get(int i) {  
        return values[i];  
    }  
}
```