

ECE 325 OBJECT-ORIENTED SOFTWARE DES (LEC A1 Fa18)

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Assignment 8: Refactoring

Due date: **Thursday 29th of November (5:00 pm)**. A working copy of your solution must be submitted to eClass before this date.

For the assignment, you will need to find out information about refactoring patterns, which does not appear in the lecture slides. The following location is an excellent starting point: <http://www.refactoring.com/catalog/index.html>.

1. Consider the following two code fragments.

Which fragment is more understandable? And why? (Hint: Think code smells)

A.

```
doublepotentialEnergy(double mass, double height) {  
  
    return mass * height * 9.81;  
  
}
```

B.

```
static final double g = 9.81;  
  
doublepotentialEnergy(double mass, double height) {  
  
    return mass * g * height;  
  
}
```

```
}
```

2. Consider the following code fragment.

```
public int funny(int a, int b) {  
    int temp = a * b;  
    if (temp > 100) {  
        return temp * 0.95;  
    } else {  
        return temp * 0.25;  
    }  
}
```

Apply the following refactoring patterns to this code fragment:

A. *Inline Temp*

B. *Extract Method Followed by Replace Temp with Query*

C. Discuss the two new code fragments, which refactoring pattern is more appropriate in this situation? And why?

3. Consider the following two code fragments.

A.

```
private int currentBalance;  
  
int withdrawFromBankAccount(int amountToBeWithdrawn) {  
    if (amountToBeWithdrawn > currentBalance)  
        return -1;  
    else {  
        currentBalance -= amountToBeWithdrawn;  
        return 0;  
    }  
}
```

B.

```
private int currentBalance;

void withdrawFromBankAccount(int amountToBeWithdrawn) throws BalanceException {
    if (amountToBeWithdrawn > currentBalance)
        throw new BalanceException(); // You can assume that BalanceException is defined
    currentBalance -= amountToBeWithdrawn;
}
```

Which refactoring pattern has been applied to the first fragment to transform it into the second code fragment? Explain why the second code fragment is superior to the first fragment.

4. Consider the following two code fragments (adapted from `java.lang.Long`).

A.

```
public static Long valueOf(long l) {
    final int offset = 128;
    if (l >= - 128 && l <= 127) { // will cache
        return LongCache.cache[(int) l + offset];
    }
    return new Long(l);
}
```

B.

```
public static Long valueOf(long l) {  
    if (l >= - 128 && l <= 127) {// will cache  
        return LongCache.cache[(int) l + 128];  
    }  
    return new Long(l);  
}
```

Fragment A is translated into Fragment B by applying the *Inline Temp* refactoring; and Fragment B is translated into Fragment A by applying the *Introduce Explaining Variable* refactoring. Provide possible situations (or contexts) where it would be advantageous to apply either refactoring to the appropriate code fragment.

5. Consider the following two code fragments.

A.



```
public class A {  
    public intk(long i) {  
        return 10;  
    }  
}  
  
public class B extends A {  
    public intk(int i) {  
        return 20;  
    }  
}  
  
public static voidmain(String[] args) {  
    System.out.println(new A().k(2));  
}  
}
```

B.

```
public class A {  
  
    public int k(long i) {  
  
        return 10;  
    }  
  
    public int k(int i) {  
  
        return 20;  
    }  
}  
  
public class B extends A {  
  
    public static void main(String[] args) {  
  
        System.out.println(new A().k(2));  
    }  
}
```

Which refactoring pattern has been applied to the first fragment to transform it into the second code fragment? Explain the impact (upon the results from function test) of the transformation.

Submission status

Attempt number	This is attempt 1 (1 attempts allowed).
Submission status	Submitted for grading
Grading status	Graded
Due date	Thursday, 29 November 2018, 5:00 PM
Time remaining	Assignment was submitted 1 day 6 hours early
Last modified	Wednesday, 28 November 2018, 10:25 AM
File submissions	<div> ArunWoosaree.java </div> <div>Export to portfolio</div>

Submission comments

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Feedback

Grade	20.00 / 20.00
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Graded on	Thursday, 6 December 2018, 1:06 AM
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Graded by	 Mona Nashaat Ali Elmowafy
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