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| **Bug Number** | 1 |
| **Description** | When a patron comes to pay an overdue fine, the amount they are charged is greater than the amount charged against the overdue loan. |
| **Pre-conditions** | Remove library.obj, build library from scratch |

# Step 1 : Replication

* This bug can be replicated by running ‘Bug 1 FAT.docx’. Below is an example with sample output (before the bug is resolved):

|  |  |  |
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| **Step** | **Expected Output/Result** | **Actual** |
| Return item that is 2 days overdue | Item returns  Charged $2.00 overdue | Text  Description automatically generated |
| Pay fine for previous overdue loan | Fine owed equals $6.00 | Text  Description automatically generated |

# Step 2 : Simplifcation

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| **Automated Test** | | Bug1Test |
| **Description** | | Given an overdue item, return it and check the overdue loan fee against the amount the patron owes. |
| **Required File** | | Bug1Test.java |
| **Set up** |  | |
| **Test** |  | |
| **Result** |  | |

# Step 3 : Tracing

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| **Debugging Log** | Bug 1 using Bug1Test |
| **Initial Observation** | Bug1Test confirms the bug. The amount the patron is required to pay does not equal the amount over the fine incurred on the overdue loan. |

## Hypothesis 1:

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| --- | --- |
| **Description** | We know from the FAT that the fine incurred is correct until the patron returns the overdue item. After the item is returned the fine is calculated incorrectly.  We can therefore begin our debugging trace within the ReturnItemControl class. |
| **Class** | ReturnItemControl |
| **Line / Variable** | currentLoan.getPatron().incurFine(totalFines) |
| **Prediction** | totalFines = $6.00 |
| **Test** | 1. Enter breakpoint in line 90: 2. Run Bug 1 FAT 3. Step the program through until break point is reached 4. Observe incurFine(totalFines) to see the amount incurred. |
| **Result** | totalFines = $2.00: |
| **Conclusion** | Hypothesis is rejected |