

Tracing & Hypothesis

Bug 2: Player cannot reach betting limit

1 Tracing

It could first be identified that the first trace is from the **Main.java** where the game is decided to continue or stop.

```
while (player.balanceExceedsLimitBy(bet) && player.getBalance() < 200)
{
    turn++;
    DiceValue pick = DiceValue.getRandom();
```

It is then identified that the bug problem is probably with the first condition, where the game must stop while the player exceeds the balance by bet amount. This method is included in the **Player.java** as:

```
public boolean balanceExceedsLimit() {
    return (balance > limit);
}

public boolean balanceExceedsLimitBy(int amount) {
    return (balance - amount > limit);
}
```

So in this case, if the limit is 0, the game would continue as long as the balance - bet > 0. So in the case that the bet is 5 as in main file, when the balance is 5, the game would stop as "5 - 5 > 0" is false.

2 Hypothesis


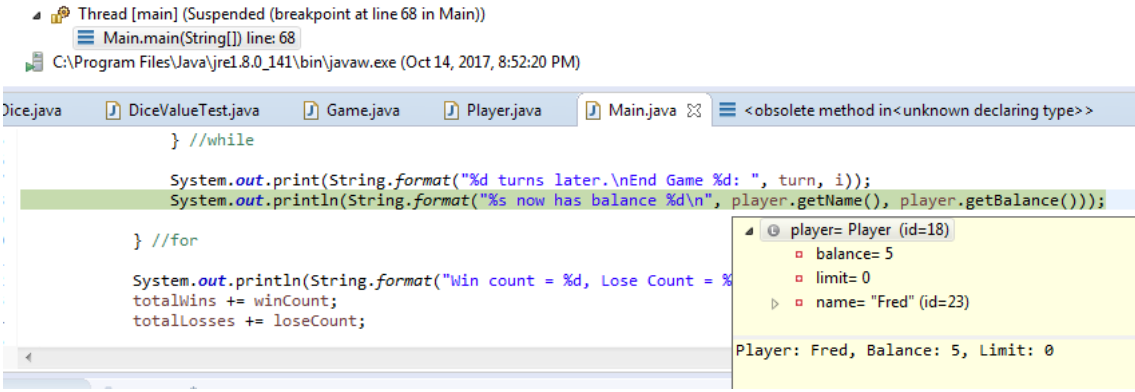
From the above guess, three hypotheses are proposed:

- **Hypothesis 1:** *setLimit()* method correctly assigns limit as zero.
- **Hypothesis 2:** *balanceExceedsLimitBy* does not include the minimum limit.
- **Hypothesis 3:** The game ends when the limit is reached.

The testing of the hypotheses is conducted by putting breakpoints at

```
return (balance - amount > limit); (in Player.java)
```

The debugging shows the results for the hypotheses as below:

HYPOTHESIS	RESULT
Hypothesis 1: <i>setLimit()</i> method correctly assigns limit as zero.	<p>(1) is correct</p> <pre>public void setLimit(int limit) { if (limit < 0) throw new IllegalArgumentException("Limit cannot be negative."); if (limit > balance) throw new IllegalArgumentException("Limit cannot be greater than balance."); this.limit = limit; }</pre> 
Hypothesis 2: The game ends (negatively) when the limit is reached.	<p>After run, the game as at balance = 5, limit = 0 so (2) is verified.</p> 
Hypothesis 3: <i>balanceExceedsLimitBy</i> does not include the minimum limit.	<p>This is apparently true</p> <pre>public boolean balanceExceedsLimitBy(int amount) { return (balance - amount > limit); }</pre>