CoinChange.java

```
1   package com.example;
2
3   public class CoinChange {
4       public static int change(int[] coins, int amount) {
5   1       int[] combinations = new int[amount + 1];
6           combinations[0] = 1;
7
8           for (int coin : coins) {
9   4           for (int i = coin; i < amount + 1; i++) {
10  2               combinations[i] += combinations[i - coin];
11              }
12          }
13
14  1       return combinations[amount];
15      }
16
17      /**
18       * This method finds the minimum number of coins needed for a given amount.
19       *
20       * @param coins The list of coins
21       * @param amount The amount for which we need to find the minimum number of
22       * coins. Finds the minimum number of coins that make a given value.
23       */
24      public static int minimumCoins(int[] coins, int amount) {
25          // minimumCoins[i] will store the minimum coins needed for amount i
26  1       int[] minimumCoins = new int[amount + 1];
27
28          minimumCoins[0] = 0;
29
30  3       for (int i = 1; i <= amount; i++) {
31              minimumCoins[i] = Integer.MAX_VALUE;
32          }
33  3       for (int i = 1; i <= amount; i++) {
34              for (int coin : coins) {
35  2               if (coin <= i) {
36  1                   int sub_res = minimumCoins[i - coin];
37  4                   if (
38                          sub_res != Integer.MAX_VALUE &&
39                          sub_res + 1 < minimumCoins[i]
40                      ) {
41  1                       minimumCoins[i] = sub_res + 1;
42                      }
43                  }
44              }
45          }
46  1       return minimumCoins[amount];
47      }
48  }
```

Mutations

5
1. Replaced integer addition with subtraction → KILLED

9
1. changed conditional boundary → KILLED
2. Changed increment from 1 to -1 → KILLED
3. Replaced integer addition with subtraction → KILLED
4. negated conditional → KILLED

10	1. Replaced integer subtraction with addition → KILLED 2. Replaced integer addition with subtraction → KILLED
14	1. replaced int return with 0 for com/example/CoinChange::change → KILLED
26	1. Replaced integer addition with subtraction → KILLED
30	1. changed conditional boundary → KILLED 2. Changed increment from 1 to -1 → KILLED 3. negated conditional → KILLED
33	1. changed conditional boundary → KILLED 2. Changed increment from 1 to -1 → TIMED_OUT 3. negated conditional → KILLED
35	1. changed conditional boundary → KILLED 2. negated conditional → KILLED
36	1. Replaced integer subtraction with addition → KILLED
37	1. changed conditional boundary → SURVIVED 2. Replaced integer addition with subtraction → SURVIVED 3. negated conditional → KILLED 4. negated conditional → KILLED
41	1. Replaced integer addition with subtraction → KILLED
46	1. replaced int return with 0 for com/example/CoinChange::minimumCoins → KILLED

Active mutators

- BOOLEAN_FALSE_RETURN
- BOOLEAN_TRUE_RETURN
- CONDITIONALS_BOUNDARY_MUTATOR
- EMPTY_RETURN_VALUES
- INCREMENTS_MUTATOR
- INVERT_NEGS_MUTATOR
- MATH_MUTATOR
- NEGATE_CONDITIONALS_MUTATOR
- NULL_RETURN_VALUES
- PRIMITIVE_RETURN_VALS_MUTATOR
- VOID_METHOD_CALL_MUTATOR

Tests examined

- com.example.CoinChangeTest.testMinimumCouns(com.example.CoinChangeTest) (2 ms)
- com.example.CoinChangeTest.testChange(com.example.CoinChangeTest) (0 ms)

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