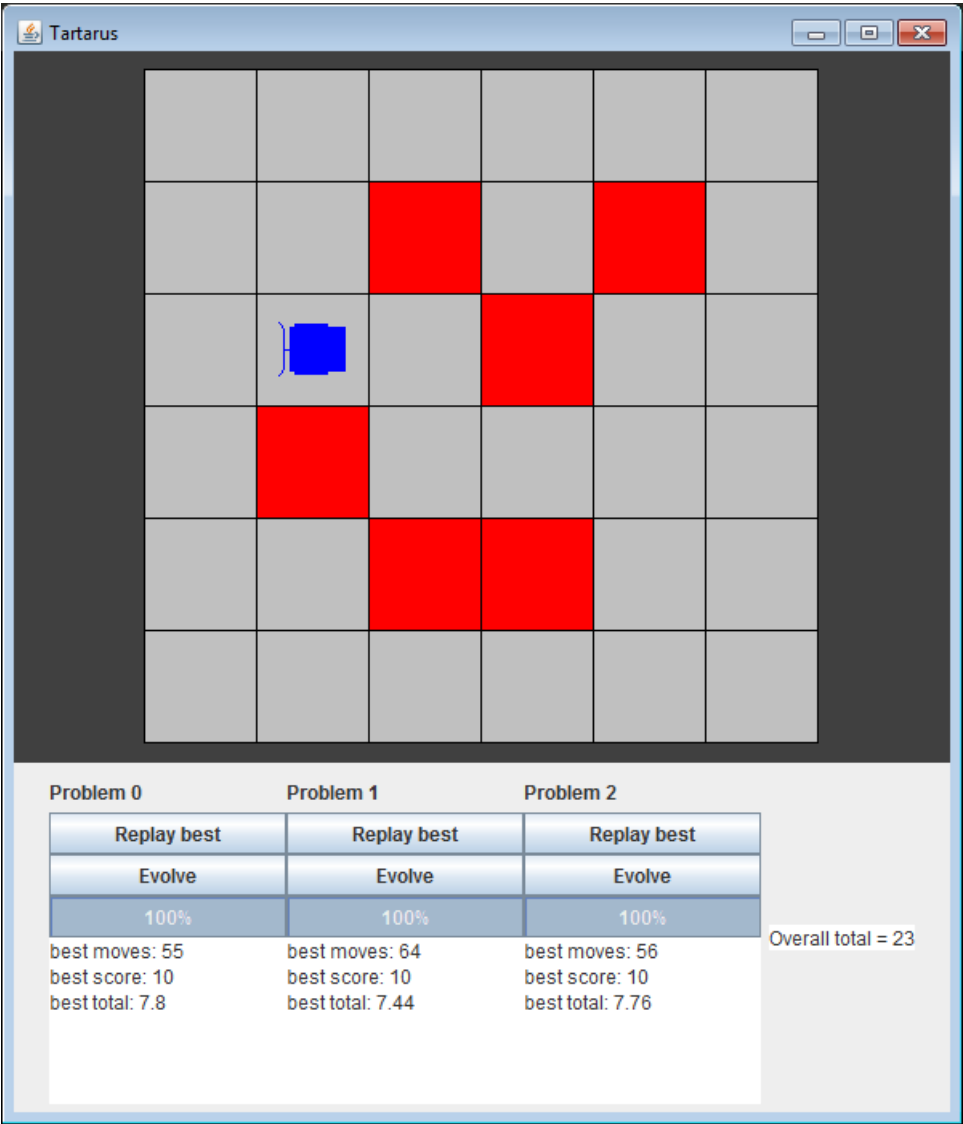


Workshop 7: GA case studies

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Initial results



# Step 6

- Remove LLL genes

## Code

```
public void develop() {
    if(Math.random() < CLEANUP_PROB) {

        // store previous genes
        char prev = '?';
        char prev2 = '?';

        // iterate each gene
        for(int i = 0; i < moves.length(); i++) {
            // if we have 3 L genes in a row, prev2, prev and current
            if(prev2 == 'L' && prev == 'L' && moves.charAt(i) == 'L') {
                // change LLL genes to RFF
                moves = moves.substring(0, i - 2)
                    + "R"
                    + moves.substring(i + 1)
                    + "FF";
                i -= 2;
            }

            // setting prev2
            if(i > 0) {
                prev2 = moves.charAt(i - 1);
            } else {
                prev2 = '?';
            }

            // setting prev
            if(i > -1) {
                prev = moves.charAt(i);
            } else {
                prev = '?';
            }
        }
    }
}
```

## Results

Problem 0	Problem 1	Problem 2	Overall total = 22.6
Replay best	Replay best	Replay best	
Evolve	Evolve	Evolve	
100%	100%	100%	
best moves: 56 best score: 10 best total: 7.76	best moves: 66 best score: 10 best total: 7.36	best moves: 63 best score: 10 best total: 7.48	

# Step 7

- Remove RRR genes

## Code

```
public void develop() {
    if(Math.random() < CLEANUP_PROB) {

        // Step 6...

        for(int i = 0; i < moves.length(); i++) {

            // Step 6 ...

            // if we have 3 R genes in a row, prev2, prev and current
            if(prev2 == 'R' && prev == 'R' && moves.charAt(i) == 'R') {

                // change RRR genes to LFF
                moves = moves.substring(0, i - 2)
                    + "L"
                    + moves.substring(i + 1)
                    + "FF";
                i -= 2;
            }
            // Step 6 ...
        }
    }
}
```

## Results

Problem 0	Problem 1	Problem 2	Overall total = 22.96
Replay best	Replay best	Replay best	
Evolve	Evolve	Evolve	
100%	100%	100%	
best moves: 55 best score: 10 best total: 7.8	best moves: 65 best score: 10 best total: 7.4	best moves: 56 best score: 10 best total: 7.76	

# Step 8

- Remove genes
  - RLF, LRF, FRL, FLR

## Code

```
// RLF to FFF
if(prev2 == 'R' && prev == 'L' && moves.charAt(i) == 'F') {
    moves = moves.substring(0, i - 2)
        + "F"
        + moves.substring(i + 1)
        + "FF";
    i -= 2;
}

// RLF to FFF
if(prev2 == 'L' && prev == 'R' && moves.charAt(i) == 'F') {
    moves = moves.substring(0, i - 2)
        + "F"
        + moves.substring(i + 1)
        + "FF";
    i -= 2;
}

// FRL to FFF
if(prev2 == 'F' && prev == 'R' && moves.charAt(i) == 'L') {
    moves = moves.substring(0, i - 1)
        + "F"
        + moves.substring(i + 1)
        + "F";
    i -= 1;
}

// FLR to FFF
if(prev2 == 'F' && prev == 'L' && moves.charAt(i) == 'R') {
    moves = moves.substring(0, i - 1)
        + "F"
        + moves.substring(i + 1)
        + "F";
    i -= 1;
}
```

## Results

Problem 0	Problem 1	Problem 2	Overall total = 23.48
Replay best	Replay best	Replay best	
Evolve	Evolve	Evolve	
100%	100%	100%	
best moves: 51 best score: 10 best total: 7.96	best moves: 56 best score: 10 best total: 7.76	best moves: 56 best score: 10 best total: 7.76	

## Step 9

---

- Ideas for other ways to improve
  - RRL to RFF
  - LLR to LFF
- Attempted to implement below
  - Worse performance
- Wrapped in `if(i > 1)` causes RRR
  - Without `if` causes `StringIndexOutOfBoundsException` error

## Code

---

```
if(i > 1) {  
    // RRL to RFF  
    if(prev2 == 'R' && prev == 'R' && moves.charAt(i) == 'L') {  
        moves = moves.substring(0, i - 2)  
            + "R"  
            + moves.substring(i + 1)  
            + "FF";  
        i -= 2;  
    }  
  
    // LLR to LFF  
    if(prev2 == 'L' && prev == 'L' && moves.charAt(i) == 'R') {  
        moves = moves.substring(0, i - 2)  
            + "L"  
            + moves.substring(i + 1)  
            + "FF";  
        i -= 2;  
    }  
}
```