

CS 1632 Software Quality Assurance

Deliverable 4

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Team Name: THE Legion

Introduction

Write your retrospective here. Please describe the division of work between group members. Also, please describe any difficulties that you faced while using VisualVM.

Both of us worked on a single computer together, as we are roommates so we could afford to do this. We both went through the code and did exploratory testing to figure out what was slowing down the program. We saw right away from using VisualVM that two methods were very slow: iterateCell and calculateNextIteration. It did not take long to determine what was wrong with the code. Then, we had to go into more detail to find that Cell.toString() was slowing down other methods. So, we debugged, found and fixed the error, and finished refactoring the methods. After fixing that, we found that toString executed roughly 250x faster. For the pinning tests, we also both just talked about what to write while one of us wrote the tests. In total, we didn't have any trouble with VisualVM, and most of the debugging went smooth.

Optimized Feature 1

- a. Write the name of the feature optimized (the label on the button) Run continuous
- b. Write the name(s) of the method(s) you refactored to optimize this feature MainPanel.iterateCell
 MainPanel.calculateNextIteration
- c. Insert hotspots-feature1-before.png

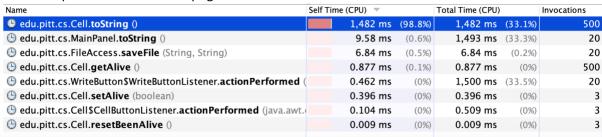
Name	Self Time (CPU)			Total Time (CPU)	Invocations	
(b) edu.pitt.cs.MainPanel.calculateNextIteration ()		28,900 ms	(53.2%)	54,091 ms	(31%)	448
(b) edu.pitt.cs.MainPanel.iterateCell (int, int)		25,095 ms	(46.2%)	25,156 ms	(14.4%)	11,200
(5) edu.pitt.cs.MainPanel.backup ()		109 ms	(0.2%)	122 ms	(0.1%)	448
(edu.pitt.cs.Cell.toString ()		69.7 ms	(0.1%)	69.7 ms	(0%)	25
(b) edu.pitt.cs.Cell.getAlive ()		41.4 ms	(0.1%)	41.4 ms	(0%)	112,050
(boolean)		37.3 ms	(0.1%)	37.3 ms	(0%)	22,503
(int, int)		25.2 ms	(0%)	51.8 ms	(0%)	11,200
(b) edu.pitt.cs.MainPanel.runContinuous ()		7.22 ms	(0%)	47,335 ms	(27.1%)	1
(boolean)		6.2 ms	(0%)	36.1 ms	(0%)	450
(String)		1.69 ms	(0%)	1.69 ms	(0%)	1
(b) edu.pitt.cs.MainPanel.toString ()		1.35 ms	(0%)	71.1 ms	(0%)	1
(5) edu.pitt.cs.FileAccess.saveFile (String, String)		0.594 ms	(0%)	0.594 ms	(0%)	1
(java.util.ArrayList)		0.165 ms	(0%)	0.566 ms	(0%)	1
(edu.pitt.cs.Cell.reset ()		0.153 ms	(0%)	0.354 ms	(0%)	25
(java.awt.event.ActionEv		0.140 ms	(0%)	2.40 ms	(0%)	1
(ja edu.pitt.cs.RunContinuousButton\$RunContinuousButtonListener.actionPerformed		0.123 ms	(0%)	0.123 ms	(0%)	1

d. Insert hotspots-feature1-after.png

(edu.pitt.cs.MainPanel.backup ()	914 ms	(31.8%)	1,152 ms	(9.7%)	1,268
(edu.pitt.cs.Cell.getAlive ()	649 ms	(22.6%)	649 ms	(5.4%)	316,809
edu.pitt.cs.MainPanel.getNumNeighbors (int, int)	518 ms	(18%)	974 ms	(8.2%)	31,675
(boolean)	290 ms	(10.1%)	290 ms	(2.4%)	63,465
(b) edu.pitt.cs.MainPanel.iterateCell (int, int)	185 ms	(6.4%)	1,215 ms	(10.2%)	31,675
(edu.pitt.cs.Cell.toString ()	101 ms	(3.5%)	101 ms	(0.9%)	25
(9) edu.pitt.cs.MainPanel.calculateNextIteration ()	72.2 ms	(2.5%)	1,545 ms	(12.9%)	1,267
(boolean))	69.5 ms	(2.4%)	258 ms	(2.2%)	1,269
(5) edu.pitt.cs.MainPanel.runContinuous ()	45.2 ms	(1.6%)	2,743 ms	(23%)	2
(String)	24.1 ms	(0.8%)	24.1 ms	(0.2%)	1
(5) edu.pitt.cs.MainPanel.toString ()	2.8 ms	(0.1%)	104 ms	(0.9%)	1
(ja edu.pitt.cs.RunContinuousButton\$RunContinuousButtonListener.actionPerformed	1.90 ms	(0.1%)	1.90 ms	(0%)	2
(java.awt.event.ActionE	0.999 ms	(0%)	105 ms	(0.9%)	1

Optimized Feature 2

- a. Write the name of the feature optimized (the label on the button) Write
- b. Write the name(s) of the method(s) you refactored to optimize this feature Cell.toString()
- c. Insert hotspots-feature2-before.png



d. Insert hotspots-feature2-after.png

Name	Self Time	(CPU) 🔻		Total Time (CPU)		Invocations
edu.pitt.cs.FileAccess.saveFile (String, String)		17.3 ms	(53.6%)	17.3 ms	(25.2%)	20
(1) edu.pitt.cs.MainPanel.toString (1)		6.37 ms	(19.7%)	12.7 ms	(18.5%)	20
edu.pitt.cs.Cell.toString ()		4.56 ms	(14.1%)	4.56 ms	(6.6%)	500
(b) edu.pitt.cs.WriteButton\$WriteButtonListener.actionPerfor	m	2.26 ms	(7%)	32.3 ms	(47%)	20
(edu.pitt.cs.Cell.getAlive ()		1.77 ms	(5.5%)	1.77 ms	(2.6%)	500