

BaciBeans:

A NetBeans Plugin for Concurrent Programs

Ashley Broadwell

Mentor: J. Stanley Warford

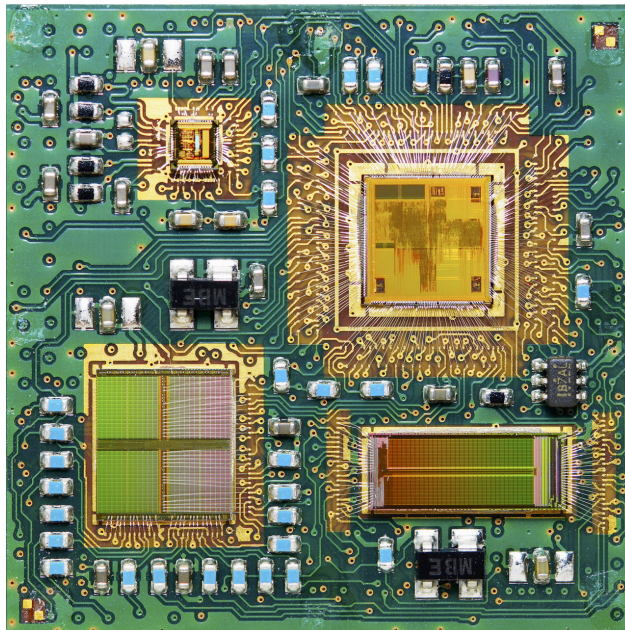
Division of Natural Science, Pepperdine University

Background

What is parallel processing?

What is C--?

When do we use this?



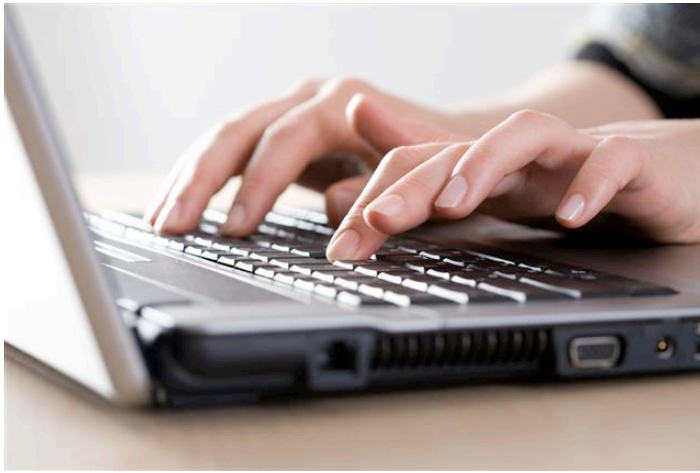
<http://developer.axis.com/old/products/mcm/>



Problem: JavaBACI Teaching Tool

JavaBACI is an open-source command line concurrency simulator used by students to compile and run C-- programs.

How do we use JavaBACI?



http://www.google.com/url?sa=i&rcrt=j&q=&esrc=s&source=images&cd=&docid=reUVzFTOX2LkM&tbnid=TV75CYNkQqv_mM:&ved=0CAYQjRw&url=http%3A%2F%2Fwww.thirdage.com%2Fimage%2Ftyping-on-computer-keyboard-jpg&ei=ZaUoU4vVtsu8oQTW54GQAQ&bvm=bv.62922401.d.cGU&psig=AFQjCNCVw3sprbwRqPU9gXcesPI-qh8g&ust=1395259107678614

```
COSC450 — bash — 89x52
ashleybwellsmbp:COSC450 AshleyBroadwell$ cat 01Count3.cm
//Ashley Broadwell
//November 8, 2012
//COSC 450
//A18

/* Copyright (C) 2006 M. Ben-Ari. See copyright.txt */

int n = 0;

void r() {
    int temp, i;
    for (i = 0; i < 10; i++) {
        temp = n;
        n = temp + 1;
    }
}

void q() {
    int temp, i;
    for (i = 0; i < 10; i++) {
        temp = n;
        n = temp + 1;
    }
}

void s() {
    int temp, i;
    for (i = 0; i < 10; i++) {
        temp = n;
        n = temp + 1;
    }
}

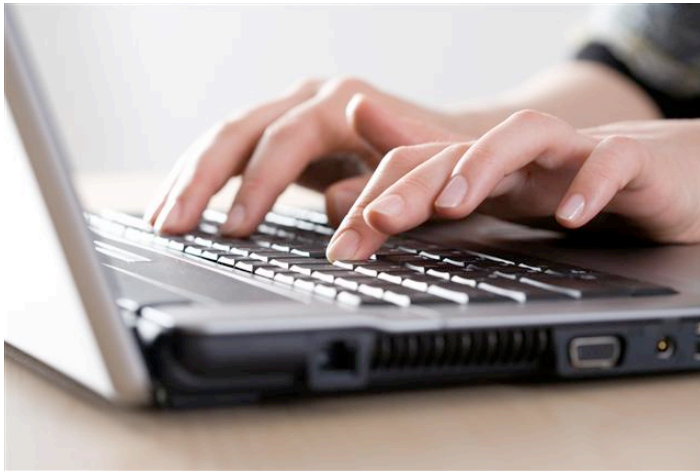
void main() {
    cobegin { r(); q(); s();}
    cout << "The value of n is " << n << "\n";
}
ashleybwellsmbp:COSC450 AshleyBroadwell$ javabaci bacc 01Count3.cm
Compilation listing is stored in 01Count3.lst
Pcode and tables are stored in 01Count3.pco
ashleybwellsmbp:COSC450 AshleyBroadwell$ javabaci bainterp 01Count3.pco
Source File: 01Count3.cm  Fri Nov 09 17:58:39 2012
Executing PCODE ...
The value of n is 21
ashleybwellsmbp:COSC450 AshleyBroadwell$
```

Problem: JavaBACI Teaching Tool

JavaBACI is an open-source command line concurrency simulator used by students to compile and run C-- programs.

How do we use JavaBACI?

With great difficulty.



http://www.google.com/url?sa=i&rcrt=j&q=&esrc=s&source=images&cd=&docid=reUVzFfOXZLkM&tbnid=TV75CYNkQv_mM:&ved=OCAYQjRw&url=http%3A%2F%2Fwww.thirdage.com%2Fimage%2Ftyping-on-computer-keyboard-jpg&ei=ZaUoU4vVtsu8oQTW54GQAQ&bvm=bv.62922401.d.cGU&psig=AFQjCNCVw3sprbwRqPU9gXcesPI-qh8g&ust=1395259107678614

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        n = temp + 1;
    }
}

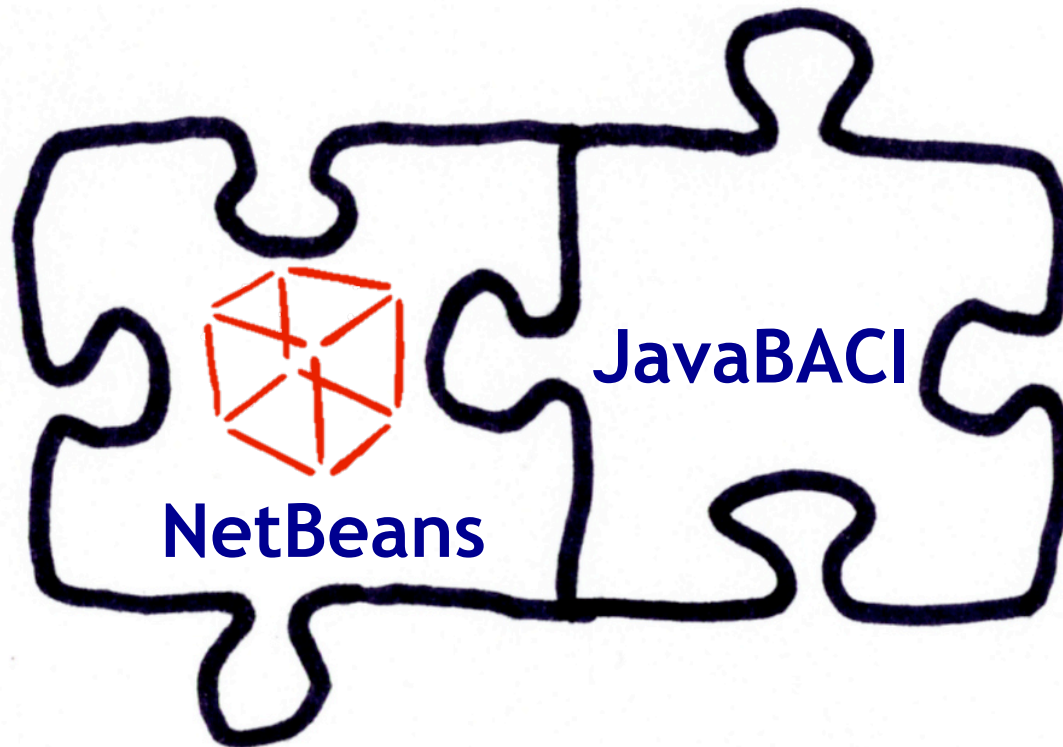
void q() {
    int temp, i;
    for (i = 0; i < 10; i++) {
        temp = n;
        n = temp + 1;
    }
}

void s() {
    int temp, i;
    for (i = 0; i < 10; i++) {
        temp = n;
        n = temp + 1;
    }
}

void main() {
    cobegin { r(); q(); s();}
    cout << "The value of n is " << n << "\n";
}
ashleybwellsmbp:COSC450 AshleyBroadwell$ javabaci bacc 01Count3.cm
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Source File: 01Count3.cm  Fri Nov 09 17:58:39 2012
Executing PCODE ...
The value of n is 21
ashleybwellsmbp:COSC450 AshleyBroadwell$
```

Solution:

BaciBeans: A NetBeans Plugin

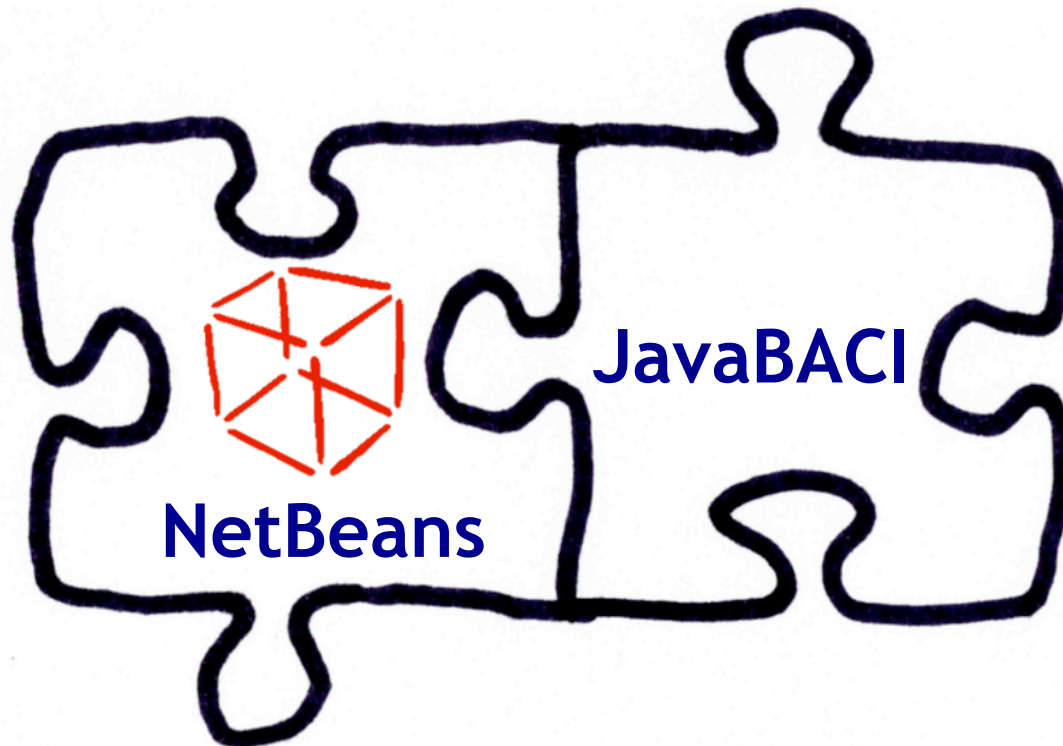


Solution:

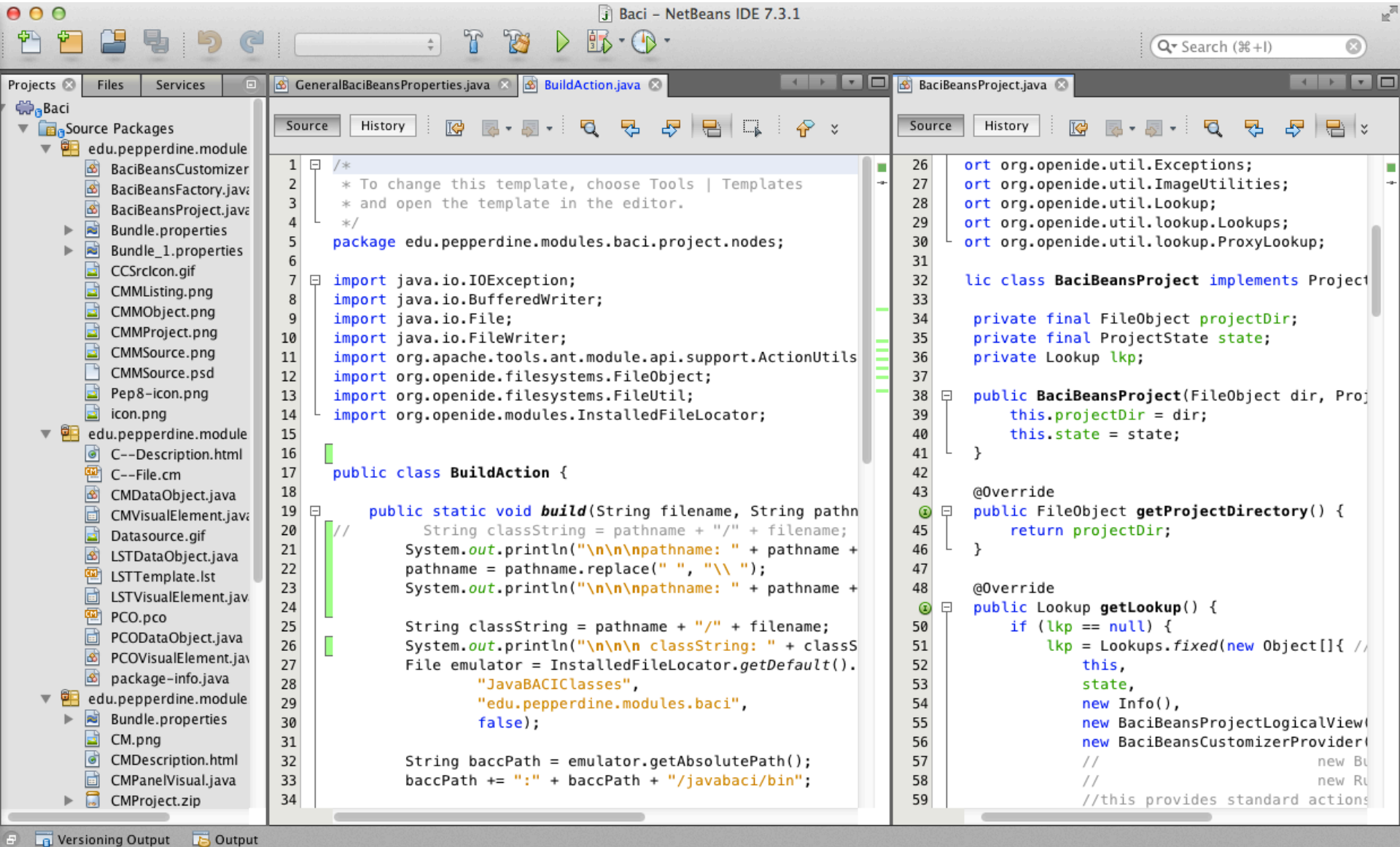
BaciBeans: A NetBeans Plugin

What is BaciBeans?

- BaciBeans is a NetBeans plugin that integrates JavaBACI into NetBeans, combining the familiarity and ease of use of NetBeans with the concurrency interpreter.



Software Tool: the NetBeans IDE



With BaciBeans: Advantages

Project Actions

Project Management

File Editor

Program Execution

The screenshot displays the NetBeans IDE 7.4 interface. On the left, the Project Navigator shows a tree view of a project named 'TestProject'. The main area is divided into three panes: the top-left pane shows the source code for 'TestProject.cm', the top-right pane shows the source code for 'JavaTestProject.java', and the bottom-right pane shows the source code for 'main.cpp'. The bottom-most pane is the Output window, which displays the results of a build and execution, including the command 'ant -f /var/folders/k6/cdm41r_s1rdvc2mrvv_vsr500000gn/T/ant-build3630304431932558191xml build' and the output 'Hello World' and 'BUILD SUCCESSFUL (total time: 0 seconds)'. Orange arrows point from the labels to the corresponding parts of the IDE: 'Project Actions' points to the toolbar, 'Project Management' points to the Project Navigator, 'File Editor' points to the code panes, and 'Program Execution' points to the Output window.

```
// File: TestProject.cm
// Author: Ashley Broadwell
// Date: Fall 2013

void main() {
    cout << "Hello World\n";
}
```

```
/*
 * To change this license header, choose License
 * To change this template file, choose Tools |
 * and open the template in the editor.
 */

package javatestproject;

/**
 *
 * @author ashleybroadwell
 */
public class JavaTestProject {

    /**
     * @param args the command line arguments
     */
    public static void main(String[] args) {
        System.out.println("Hello World");
    }

}
```

```
/*
 * File: main.cpp
 * Author: ashleybroadwell
 * Created on November 12, 2013, 2:23 PM
 */

#include <cstdlib>
#include <iostream>
using namespace std;

/*
 *
 */
int main(int argc, char** argv) {
    cout << "Hello World" << endl;
}
```

```
ant -f /var/folders/k6/cdm41r_s1rdvc2mrvv_vsr500000gn/T/ant-build3630304431932558191xml build
build:
Compilation listing is stored in /Users/ashleybroadwell/Dropbox/bacibeans/TestProject/TestProject.lst
Pcode and tables are stored in /Users/ashleybroadwell/Dropbox/bacibeans/TestProject/TestProject.pco
Source File: /Users/ashleybroadwell/Dropbox/bacibeans/TestProject/TestProject.cm Wed Oct 30 11:57:08 2013
Executing PCODE ...
Hello World
BUILD SUCCESSFUL (total time: 0 seconds)
```


BaciBeans: Demo

Conclusion

- BaciBeans provides students with a new and improved way to program in C-- by allowing students to use the familiar NetBeans IDE.

Conclusion

- BaciBeans has several advantages over the existing system to edit, build, run, and debug on the command line interface using the JavaBACI executable by incorporating the C-- project, file type, and actions within the NetBeans IDE.

Conclusion

- Students also benefit from the project management feature of NetBeans, which allows them to maintain Java, C++, and C-- programs coexisting in the same project group.

Conclusion

- BaciBeans is successfully used in the Programming Paradigms course at Pepperdine University.

Further Plans

We have several plans for improving BaciBeans in the future including

- C-- syntax highlighting and formatting
- code completion capabilities

Acknowledgements:

Support for this project was provided by the Natural Science Division at Pepperdine University and the Academic Year Undergraduate Research Initiative (AYURI) Fall 2013.

References:

[1] Ben-Ari, M. *Principles of Concurrent and Distributed Programming*, Addison- Wesley Pearson, Harlow, England, second edition, 2006.

[2] Camp, Tracy. *BACI System*. Colorado School of Mines. Web. 13 Nov. 2013. <<http://inside.mines.edu/~tcamp/baci/baci.html>>.

[3] Gamma, Erich, et al. *Design Patterns: Elements of Reusable Object-Oriented Software*. Addison-Wesley Longman, Inc. Reading, Massachusetts, 1994. Print.