Bang for the Buck

efficient, effective startup software development
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Lessons from CS193S

• Scalable Web Programming at Stanford
• Promoted GWT, Git, Agile Development
• Tested side by side with PhP, Javascript

• 10 out of 55 students founded startups
Startups are Impossible

• New, often unproven ideas
• Untested stakeholders/collaboration
• Fierce competition

• How do you beat the odds?
Stack the Deck

• Forecast what’s next
• Innovate only in area of expertise
• Maximize available resources
• Maximize sustainable pace
• Minimize development cycle
• Minimize engineering effort
Lazy: the Startup Way

• The smartest developers write less code
  • more maintainable
  • fewer failure points
  • often faster
  • more reuse
Wacky Obstacles

• Platform Proliferation & Incompatibility
  • Browser: HTML5, Javascript, AJAX
  • Android: Java, iPhone: Objective C
  • Desktop: C#, Objective C, Java
  • Server: C, C++, Java, Python, Ruby, PHP
• Google: top 10 computer languages
Stinkin’ Frameworks

- Mitigate the multiplatform problem
- GWT [Java], MGWT
- Node.js [Javascript]
- PhoneGap [Javascript]
- Pajamas (pyjs) [Python]
Tough Considerations

• Development pace, parsimony
• Distribution: Ubiquity
• Maturity, predictability, testability
• Dev. Environment: Eclipse, Cloud9

• GWT wins in a squeaker for now
import com.google.gwt.canvas.dom.client.CssColor;
import com.google.gwt.canvas.client.Canvas;
import com.google.gwt.canvas.dom.client.Context2d;

private void paintCanvas() {
    final String canvasID = "canvasID";
    final String unsupported = "Your browser does not support the HTML5 Canvas";
    final int width = 300;
    final int height = 300;
    final CssColor orange = CssColor.make(255, 127, 0);
    final CssColor purple = CssColor.make(159, 0, 159);

    Canvas canvas = Canvas.createIfSupported();
    if (canvas == null) {
        Label label = new Label(unsupported);
        RootPanel.get(canvasID).add(label);
    } else {
        canvas.setWidth(width + "px");
        canvas.setHeight(height + "px");
        canvas.setCoordinateSpaceWidth(width);
        canvas.setCoordinateSpaceHeight(height);
        RootPanel.get(canvasID).add(canvas);

        Context2d context = canvas.getContext2d();
        context.beginPath();
        context.setFillStyle(orange);
        context.fillRect(50, 150, 100, 100);
        context.closePath();
    }
}

................ HTML Page .....................

<body>
    <table align="center">
        <tr>
            <td id="canvasID"></td>
        </tr>
    </table>
</body>
Sample Client Code

    // Interface
    import com.google.gwt.user.client.rpc.AsyncCallback;

    public interface GreetingServiceAsync {
        void greetServer(String input, AsyncCallback<String> callback)
            throws IllegalArgumentException;
    }

    // Implementation
    public class Comparator implements EntryPoint {
        private final GreetingServiceAsync greetingService = GWT.create(GreetingService.class);

        public void onModuleLoad() {
            // ...
            private void sendComputationToServer() {
                long number = 1000 * 1000 * 1000 * 1000; // emulated in javascript by GWT
                comparisonService.comparisonServer(number,
                    new AsyncCallback<String>() {
                        public void onFailure(Throwable caught) {
                            // Show the RPC error message to the user
                            display(caught.getMessage());
                        }
                        public void onSuccess(String compareResult) {
                            display(compareResult);
                        }
                    });
            }
        }
    }
Sample Server Code

// Interface
import com.google.gwt.user.client.rpc.RemoteService;
import com.google.gwt.user.client.rpc.RemoteServiceRelativePath;

@RemoteServiceRelativePath("comparator")
public interface ComparisonService extends RemoteService {
    String comparisonServer(long input) throws IllegalArgumentException;
}

// Implementation
public class ComparisonServiceImpl extends RemoteServiceServlet implements ComparisonService {

    public String comparisonServer(long input) throws IllegalArgumentException {
        if (input < 0) {
            throw new IllegalArgumentException("input must be a natural number");
        }

        long val = 1000 * 1000 * 1000 * 1000; // trillion (40 binary bits)
        if (input == val) // shows that GWT emulates the long type in the browser
            return "The browser input " + input + "matches the server number " + val;
        else
            return "The browser input " + input + "does not match the server number " + val;
    }
}
GWT Advantages

• Java user base, maintainability
• Well supported open source codebase
• Familiar native interface for custom work
Java can be Everywhere

• Android
• mobile browser via PhoneGap & MGWT
• Browser via GWT
• Desktop & Server

• This is a totally new situation!
Development Tips

• No such thing as premature optimization
• Testing costs up front but saves later
• Communication costs up front wins big
• A top coder is exponentially better
Parting Thoughts

• Build a company like you engineer code
• Subject everything to measurement
• Write source code to be read
• Tools are integral to team communication
• Best communication = fastest team