

Union Pacific Multimedia Wall

IOWA STATE UNIVERSITY
Department of Electrical and Computer Engineering

CYRIS: MAY 15-19

UNION PACIFIC MULTIMEDIA WALL

TOUCH THE SCREEN TO BEGIN

TEAM INFORMATION

CYRIS GROUP



**RANDY
GROH**
TEAM
LEADER



**ALEX
HAYNES**
CODE
TESTER



**BRANDON
KUHA**
WEB
MASTER



**BRYLEE
RAUPP-TIMMONS**
KEY CONCEPT
HOLDER



**IAN
ROSENBERY**
CODE
TESTER



**MARIA
VOGENSEN**
KEY CONCEPT
HOLDER



**AARON
ZATORSKI**
COMMUNICATIONS
DIRECTOR

ADVISOR: MANIMARAN GOVINDARASU

CLIENT: BROCK ASCHER

UNION PACIFIC MULTIMEDIA WALL



CYCLONE REAL TIME INTERACTIVE SYSTEM (CYRIS)

- DESIGNED TO CAPTURE ATTENTION
- LEARNING TOOL FOR STUDENTS
- SHOWCASE THE ECPE

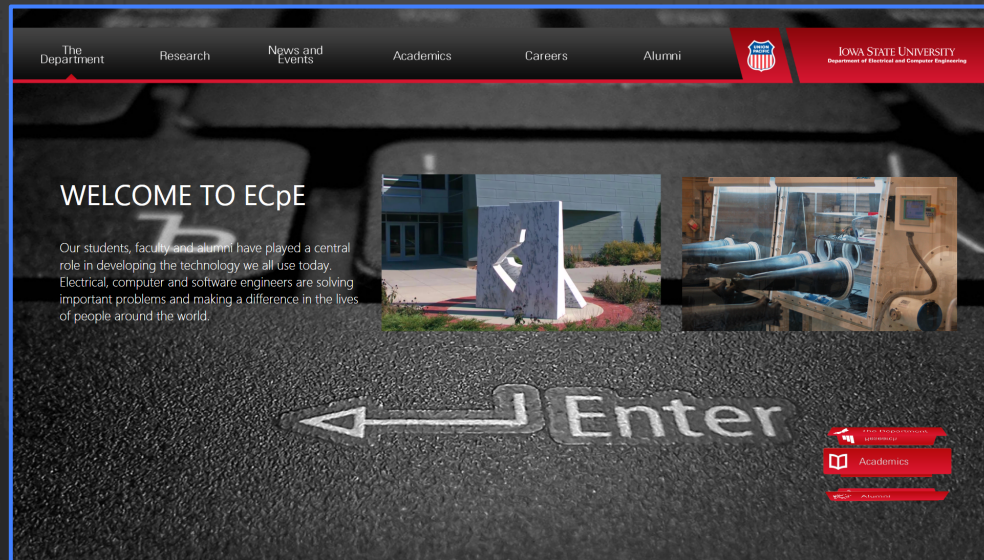
UNION PACIFIC MULTIMEDIA WALL



- 12 55" LED HDTVs
- 72 POINT MULTI-TOUCH IR BEAM GRID
- BOSE 5.1 SURROUND SOUND
- DEDICATED WINDOWS MACHINE
- 55" PANASONIC TOUCH MONITOR TEST MACHINE

PROBLEM STATEMENT

THE CURRENT INTERFACE AND CONTENT DISPLAYED ON THE UNION PACIFIC MULTIMEDIA WALL IS UNINTERESTING, UNINTUITIVE, SLUGGISH, AND FAILS TO DEMONSTRATE THE INTERACTIVE POTENTIAL THAT THE HARDWARE CAN PROVIDE.



GOALS

CREATE ENTICING APPLICATIONS

- LEVERAGE FULL HARDWARE POTENTIAL
- EASILY MAINTAINABLE

REVAMP MAIN LAYOUT

- DEPLOY CREATED APPLICATIONS
- INTUITIVE NAVIGATION
- DISPLAYS DYNAMIC INFORMATION
- VISUALLY SCALABLE CONTENT

CONSTRAINTS & CONSIDERATIONS

- INTUIFACE'S LIMITED ABILITY TO:
 - EMBED THIRD-PARTY APPLICATIONS
 - PROVIDE DYNAMIC CONTENT
 - CREATE CUSTOMIZED ASSETS
- ACCURACY AND RESPONSE TIME OF IR SENSORS
- LACK OF SOURCE CODE FROM PHASE I
- SCHEDULING ACCESS TO MAIN DISPLAY

REQUIREMENTS

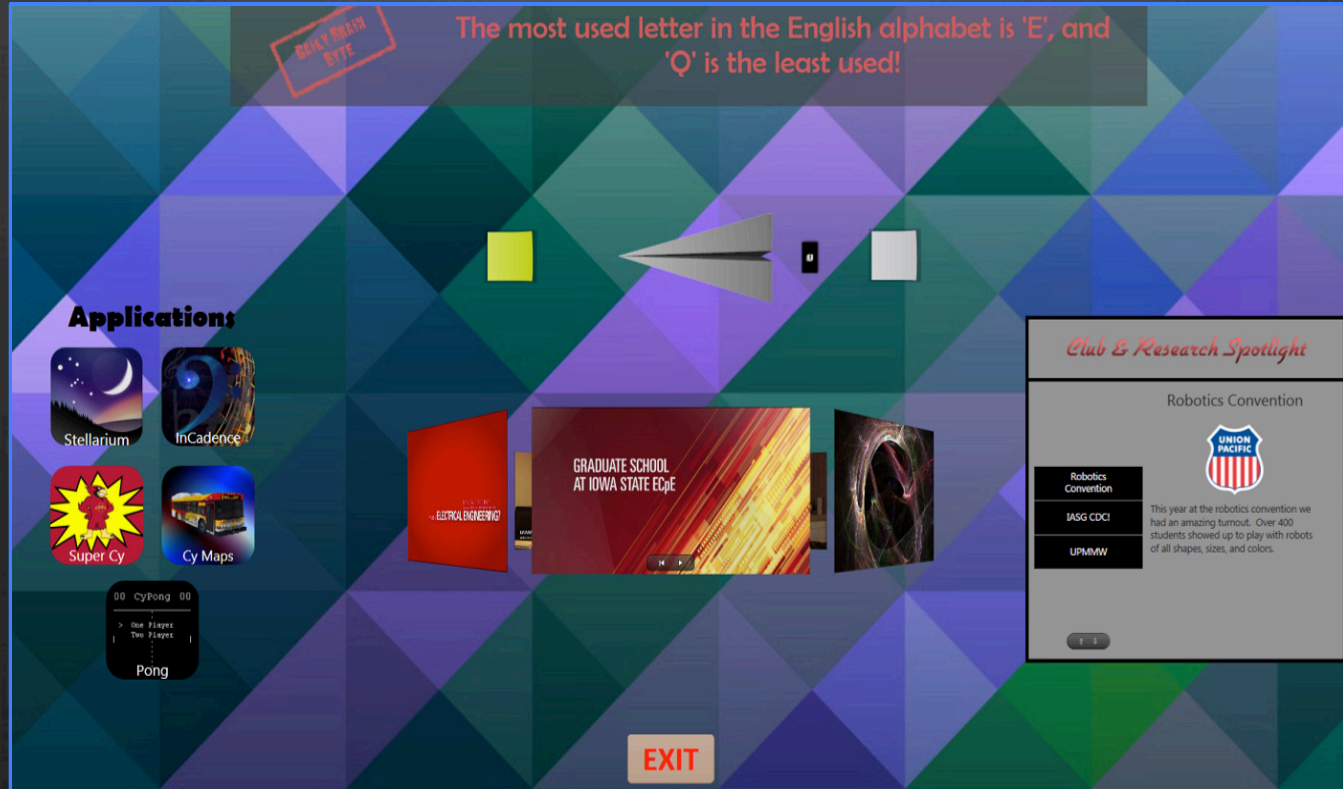
FUNCTIONAL

- LAUNCHABLE APPLICATIONS WITH MINIMAL NAVIGATION
- DISPLAY RELEVANT INFORMATION TO MULTIPLE VIEWERS CONSISTENTLY
- TRANSITIONS BETWEEN MAIN INTERFACE AND APPLICATIONS

NON-FUNCTIONAL

- MINIMIZE SYSTEM RESPONSE TIME
- SECURE & RELIABLE
- USER FRIENDLY
- INVITING TO USERS

CONCEPTUAL LAYOUT



STELLARIUM APP & SCREENSAVER

REALISTIC SKY FOR THE NAKED EYE

OPEN SOURCE STAR EXPLORATION

SUNSET-TO-SUNRISE SCREENSAVER

EXPLORE COUNTLESS STARS, PLANETS & CONSTELLATIONS

CHALLENGES:

BUILDING STELLARIUM FROM OPEN SOURCE REPOSITORY

WORKING WITH INTUIFACE DESIGNERS TO CREATE A CUSTOM INTERFACE ASSET



Earth, Ames, 292m FOV 98.9° 15.4 FPS 2015-03-10 20:59:56 UTC-05:00



stellarium

latest version is 0.13.2

BRAIN BYTE / SUPER CY

FAST

Outer space is only
an hours' drive away...
...If your car could drive
straight upwards.



CLUB & RESEARCH SPOTLIGHT

CHALLENGES:

- I. GETTING ACCESS TO VIRTUAL MACHINE.
- II. WORKING WITH LIMITATIONS OF INTUIFACE INTERFACE DESIGN.

SOLUTIONS:

- I. CONTACTING WITH VIRTUAL MACHINE MANAGEMENT AT ISU.
- II. USED A STATIC LAYOUT TO PREVENT DISTORTION.

Club & Research Spotlight

Robotics
Convention

Robotics Convention

IASG CDC!

UPMMW

Senior
Design- May
19

Solar Car
Expo

Programmin
g Challenge

FAN Club

Highschool
Visit



This year at the robotics convention we had an amazing turnout. Over 400 students showed up to play with robots of all shapes, sizes, and colors.

Cyris: Club & Research Spotlight

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IASG - 2015 Cyber Defence Competition

↓ SAMPLE TITLE

SAMPLE TITLE

Scrollable Stories

Exit Button

Relevant Picture

Information Assurance and Security Group (IASG) - 2015 Spring Cyber Defense Competition

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis in pede. Nulla facilisi. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis in pede. Nulla facilisi. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis in pede. Nulla facilisi. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis in pede. Nulla facilisi. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis in pede. Nulla facilisi. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis in pede. Nulla facilisi.

This screen will automatically scroll through stories pausing for 1 minute for each story if there is a 15 minute inactivity period. A user can exit the Club and Research spotlight application to the main presentation screen via the exit button.

C&R Spotlight Feature List:

- Scrolling List of Stories.
- Stories Contain: Relevant image of club or research group, Title for the specific story, and a relevant description for the research or club activity.
- Application can either be navigated with touch controls, or will automatically scroll through stories pausing for 1 minute for each story (exiting after 15 minutes of inactivity).

The C&R Spotlight gives Clubs and Research groups the ability to:

- Display a project to a wide audience of individuals
- Promote the club or research group

About Cyris

The Cyclone Real Time Interactive System is a interactive multi-media wall located at the front entrance of Coover Hall. Cyris was originally administered by Iowa State's Electrical and Computer Engineering Department.

Our group was tasked with developing applications to be placed on this wall, the Club & Research Spotlight is just one of them.

- [Cyris Website](#)



Form

[Home](#)[Form](#)[Submissions](#)[Account](#)[Log Out](#)

Submission Form

Title

Prepared do an dissuade be so whatever steepest.

Content Text

Warmly little before cousin sussex entire men set. Blessing it ladyship on sensible judgment settling outweigh. Worse linen an of civil jokes leave offer. Parties all clothes removal cheered calling prudent her. And residence for met the estimable disposing. Mean if he they been no hold mr. Is at much do made took held help. Latter person am secure of estate genius at.

Wise busy past both park when an ye no. Nay likely her length sooner thrown sex lively income. The expense windows adapted sir. Wrong widen drawn ample eat off doors money. Offendinga belonaina promotion provision an be oh consulted ourselves it. Blessina welcomed ladyship she met humoured

white-spotlight-hi.png

SUBMIT

Content

[Home](#)[Form](#)[Submissions](#)[Account](#)[Log Out](#)

Actions

New Content

ContentID	SubmittedID	ApprovedID	PhotoID	ContentDate	ArchivedDate	Title	Actions
2	1	2	1	4/7/15, 12:00 AM		Test Entry	View Edit Delete

< previous next >

1 of 1

Users

[Home](#)[Form](#)[Submissions](#)[Account](#)[Log Out](#)

Actions

New User

Id	Email	UserStatus	AdminStatus	Actions
1	bmk@lastae.edu	1		View Edit Delete
2	bmk@gmail.com	1	1	View Edit Delete

< previous next >

1 of 1

Users

[Home](#)[Form](#)[Submissions](#)[Account](#)[Log Out](#)

1

Actions

[Edit User](#)[Delete User](#)[List Users](#)[New User](#)

Email

bmk@iastae.edu

Pass

\$2y\$10\$dZ/acmID5KkONQtMj773ve5hBsmq2s99bfpMF0Boo6XzXskW.44aq

Id

1

UserStatus

Yes

AdminStatus

No

TICKER

FIND A WORKSTATION NEAR YOU

Lab co2050
7 Linux
0 Mac
0 Other

Lab co1313
3 Linux
5 Mac
0 Other



INTUIFACE



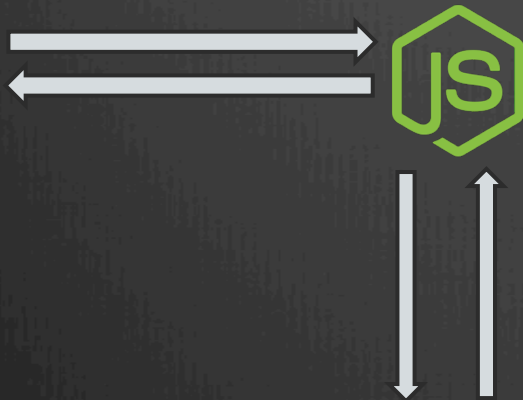
SALT MINION API

DIRECTORY SEARCH

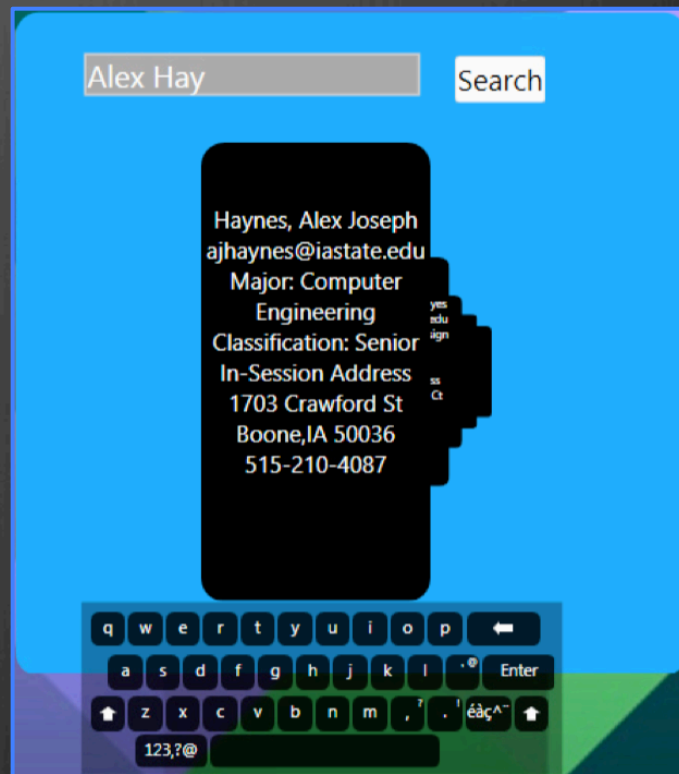
LOOK ME UP SOMETIME



GET /SEARCH?
TERM=ALEX HAY



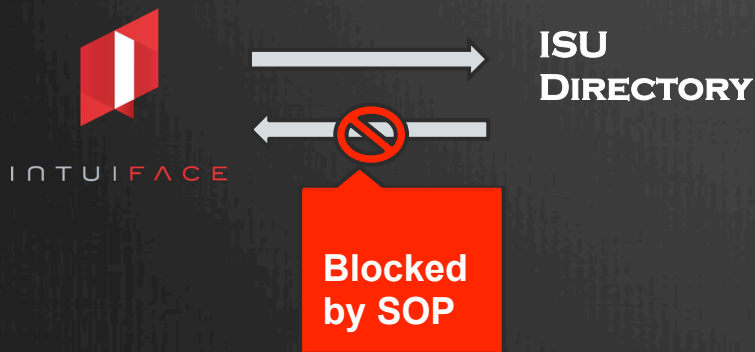
ISU DIRECTORY



SAME-ORIGIN POLICY

TECHNICAL CHALLENGE

PROBLEM



SOLUTION



NODE.JS

- CIRCUMVENTS SOP
- EASIER TO FUTURE PROOF
- EASIER PARSING / FORMATTING
- CENTRAL LOCATION FOR ALL API ENDPOINTS

INCADENCE (MUSIC MACHINE)

PLAY 3 INSTRUMENTS

- KEYBOARD SYNTHESIZER
- DRUM SEQUENCER
- DRUM PAD

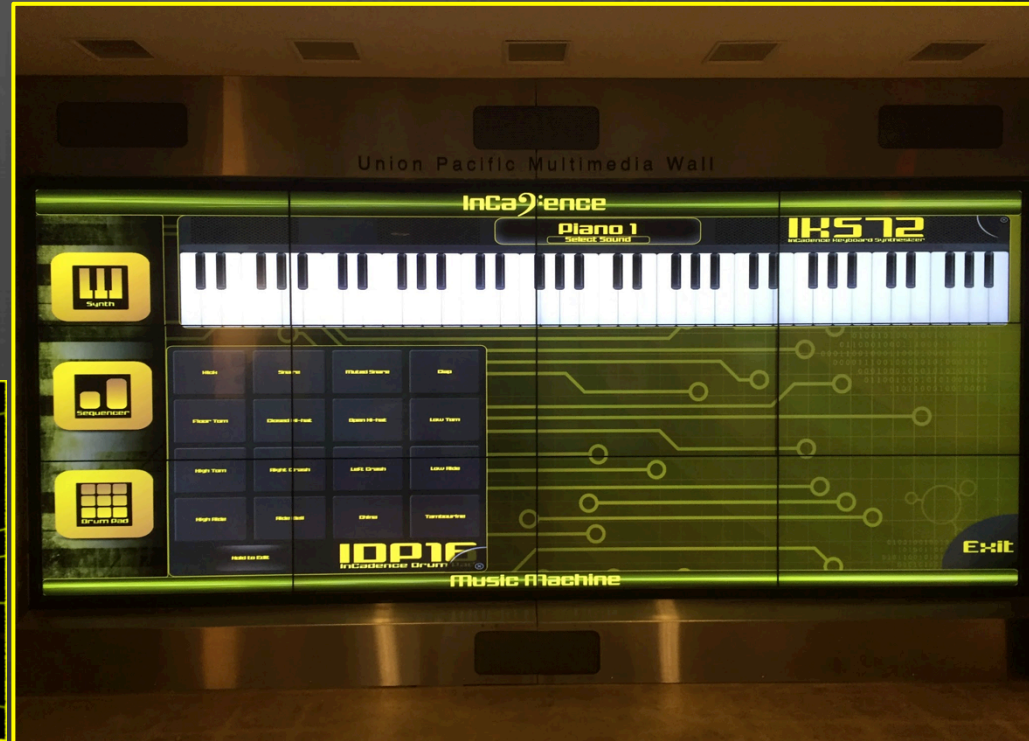
OVER 150 MIDI SOUNDFONTS

- 129 SYNTH MIDI SOUNDFONTS
- 28 DRUM MIDI SOUNDFONTS

EMBRACE YOUR FUGUE

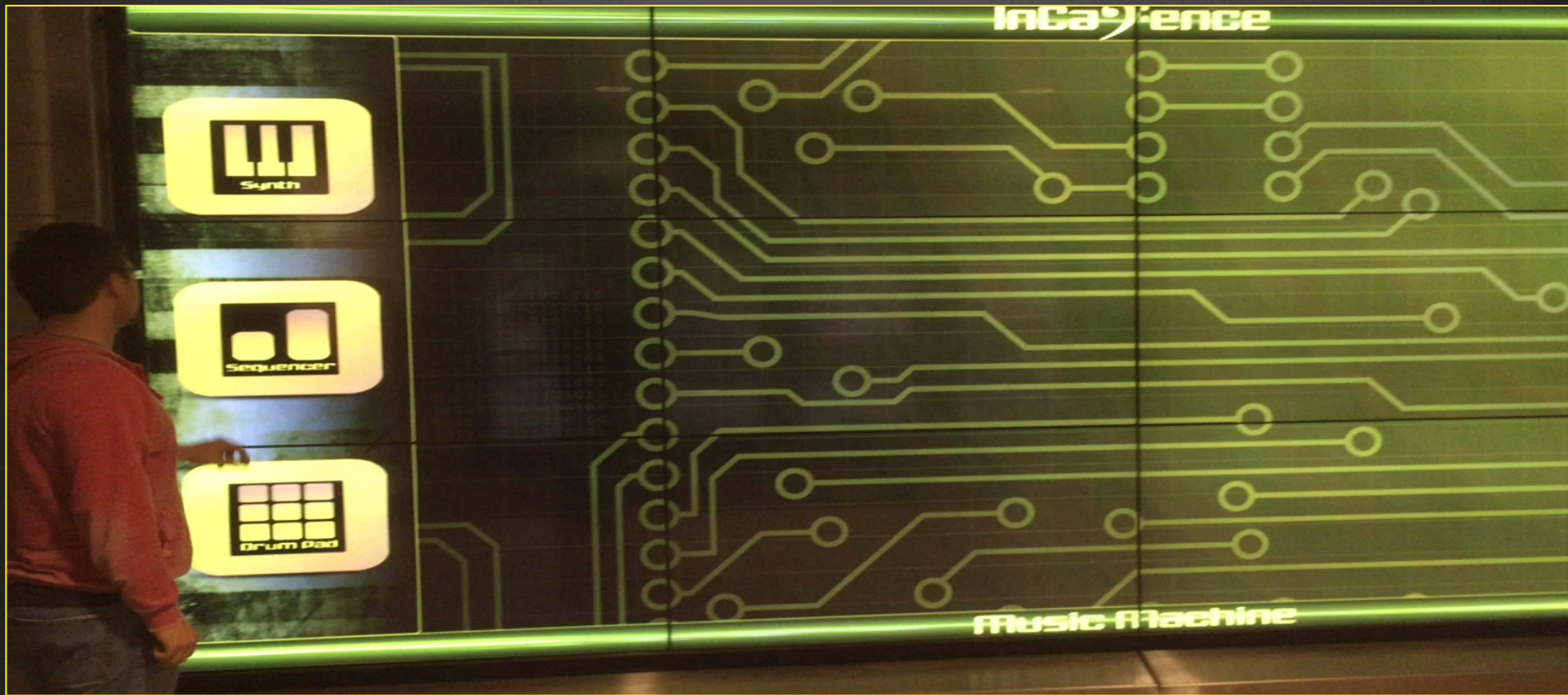


SPLASH SCREEN



KEYBOARD SYNTHESIZER (TOP) - DRUM PAD (LEFT)
DRUM SEQUENCER (NEXT SLIDE)

INCADENCE (DRUM SEQUENCER)



INCADENCE (SOLUTIONS)

CHALLENGES

- I. WORKING WITHIN HARDWARE CONSTRAINTS
- II. UNDERSTANDING OPEN-SOURCE LIBRARIES WITH MINIMAL DOCUMENTATION
- III. IMPLEMENTING CHANGES TO OPEN-SOURCE LIBRARIES TO FIT SPECIFIC NEEDS
- IV. INTEGRATING DIFFERENT OPEN-SOURCE LIBRARIES TOGETHER

OPEN-SOURCE LIBRARIES



MULTI-TOUCH FOR JAVA

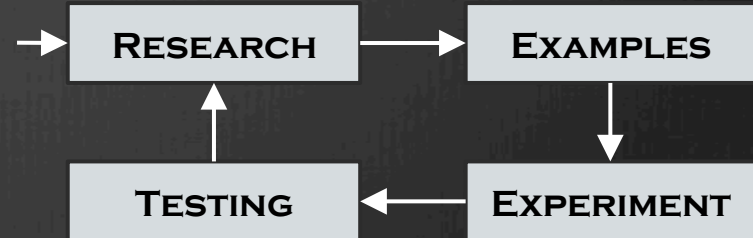


PROGRAMMING MUSIC IN JAVA

SOLUTIONS TO (I.)

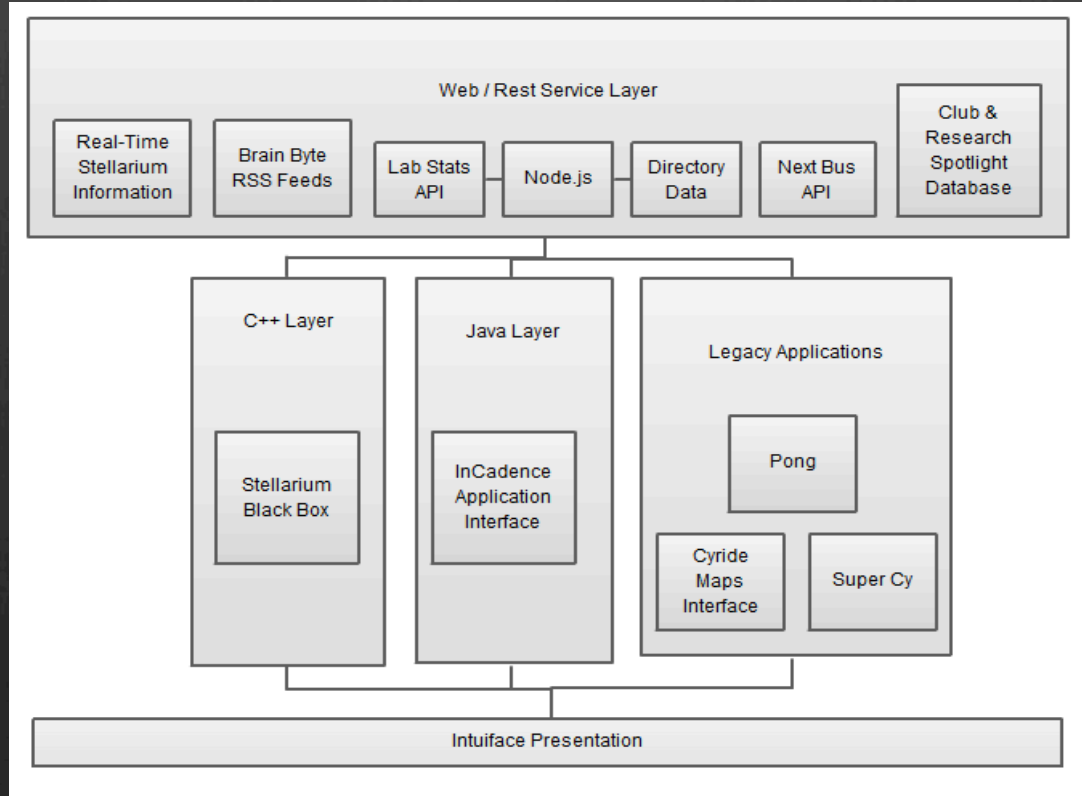
- OPTIMIZED/MINIMIZED NUMBER OF SYSTEM CALLS IN CODE TO REDUCE LATENCY.
- CREATED DRUM SEQUENCER THAT DOESN'T DEPEND ON LATENCY.

SOLUTIONS TO (II. III. IV.)

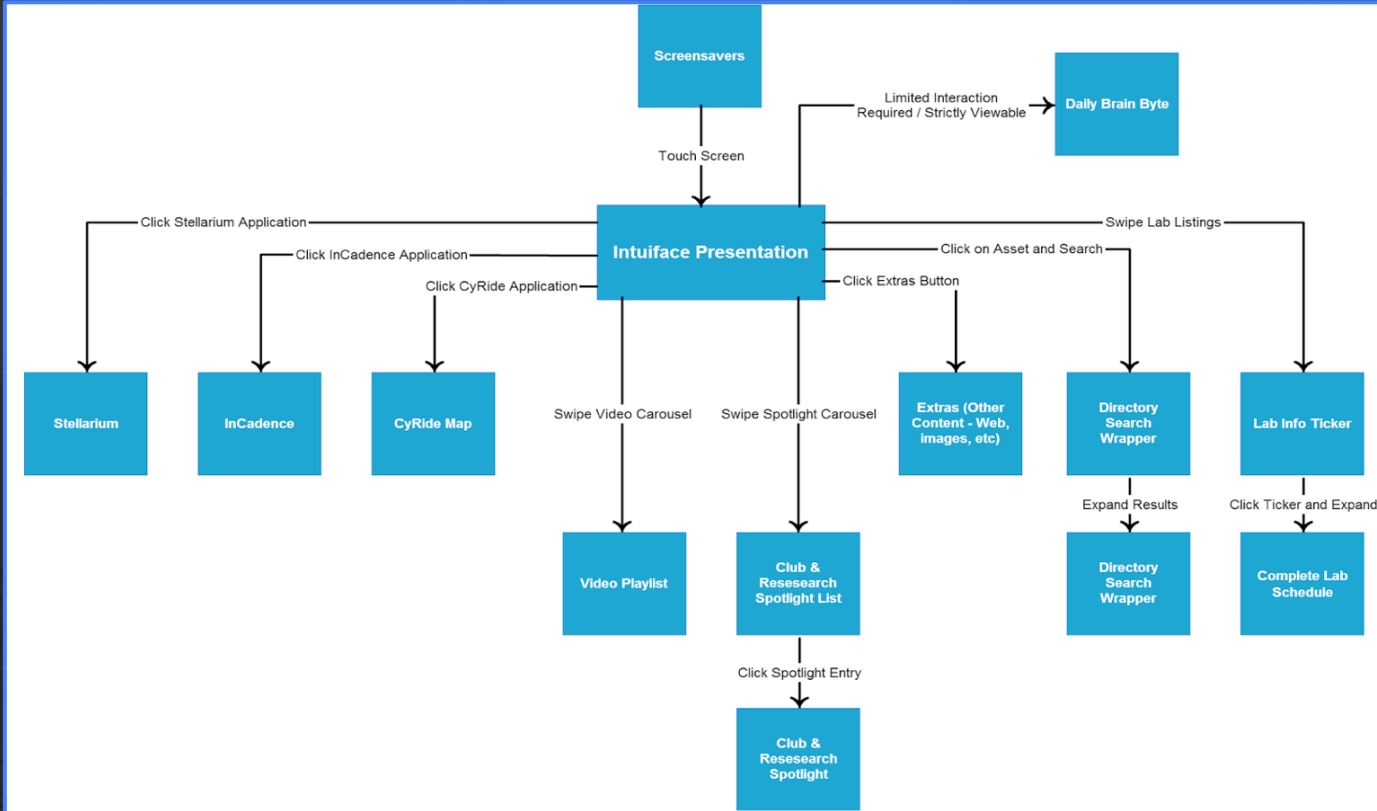


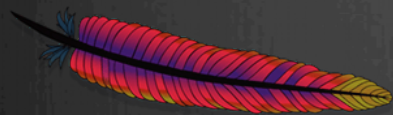
SYSTEM DESIGN

MODULAR DECOMPOSITION



UI FLOW





PLATFORM USAGE

APACHE
HTTP SERVER



I N T U I F A C E



TESTING

DUE TO HIGH GUI DEVELOPMENT IN OUR PROJECT, THE MAJORITY OF TESTING WAS DONE BY USER-LEVEL TESTS AND A STRENUOUS MANUAL PROCESS WITH A SMALL AMOUNT OF ITERATIVE UNIT TESTING.

USER-LEVEL TESTS (FAN CLUB EVENTS)

- USABILITY
- PERFORMANCE
- ACCESSIBILITY
- ENTICEMENT

SECURITY / OPERATIONAL TESTING

- WINDOWS SHORTCUTS EXPOSURE
- WINDOWS BAR EXPOSURE
- STATIC WALL PREVENTION

PERFORMANCE TESTS

- 5 SECOND LAUNCHES
- FREQUENT UPDATES WITHIN EVERY 5 MINUTES
- 2 SECOND EXITS

FAN CLUB SURVEY FEEDBACK

DIRECTORY SEARCH:

Q: WAS THE PURPOSE OF THE DIRECTORY SEARCH INTUITIVE? WHY OR WHY NOT?

A: *SOMEWHAT NOT. COULD USE A LABEL TO CLARIFY WHAT IT DOES.*

Q: THE APPLICATION IS LIMITED TO 6 RESULTS. HOW MANY SHOULD IT SHOW?

A: *6 IS FINE, I DON'T ANTICIPATE NEEDING MORE.*

INCADENCE:

Q: WAS EACH INSTRUMENT INTUITIVE TO USE (I.E. PLAY, DRAG, SCALE)? WHY OR WHY NOT?

A: *PIANO NEEDED MORE SENSITIVITY, AND HOW TO CLOSE AN INSTRUMENT WAS NOT INTUITIVE BY JUST LOOKING AT IT.*

STELLARIUM:

Q: THE OPTION BUTTONS ARE ONLY ACCESSIBLE BY DRAGGING UP FROM THE BOTTOM OF THE SCREEN. WHERE IS THE MOST CONVENIENT PLACE THAT THEY SHOULD BE?

A: *ALONG THE LEFT SIDE.*

TICKER:

Q: WAS THE PURPOSE AND INFORMATION INTUITIVE AND UNDERSTANDABLE? WHY OR WHY NOT?

A: *YES, THIS WOULD BE GREAT FOR COLLEGE TOURS/VISITS; HOWEVER, INSTEAD OF SAYING OTHER, SAY WINDOWS.*

RESOURCE & COST ESTIMATE

RESOURCE	ESTIMATED PRICE
INTUILAB ENTERPRISE EDITION LICENSE - COMPOSER	\$996/YEAR
INTUILAB ENTERPRISE EDITION LICENSE - WINDOWS PLAYER	\$310/YEAR

GROUP RESPONSIBILITIES

RANDY GROH

- CMS | CLUB & RESEARCH SPOTLIGHT
- DAILY BRAIN BYTE
- SUPER CY

ALEX HAYNES

- DIRECTORY SEARCH
- TICKER

BRANDON KUHA

- CMS | CLUB & RESEARCH SPOTLIGHT

IAN ROSENBERY

- INCADENCE (MUSIC MACHINE) - RECORDING
- CYMAPS RECOVERY

BRYLEE RAUPP-TIMMONS

- INCADENCE (MUSIC MACHINE)
- CYMAPS

MARIA VOGNSEN

- TICKER

AARON ZATORSKI

- STELLARIUM SCREENSAVER/ APPLICATION
- CYMAPS