



ClassOpen Successor

Julian Jones and Ethan Stong

Introduction

- No all-in-one planner
- Archaic UI
- No mobile support

The screenshot displays the 'Current ClassOpen Interface' with a search filter at the top and a 'Yearly Class Schedule' table below. The search filter includes dropdowns for Class #, Department (ENGI Engineering), Subject (Any), Campus (Any), Level (Any), Status (Any), General Studies (Any), Credits (Any), Day (Any Day), and Time (Any Time). It also features an 'Instructor Name' field, a 'Year/Term' dropdown (2023 - 2024), and buttons for 'Search', 'Clear Search', and 'Syllabus Library (login required)'. The 'Yearly Class Schedule' table lists 137 classes with columns for Class#, Sub, Sem, and various days (Sun 23, Aug 23, Wtr 24, Spr 24, Sum 24, Sec, GS, Cr). The table includes course titles, status, enrollment counts, waitlist, fees, meeting times, classrooms, instructors, and campus information. Some rows include 'Special Notes' such as 'Department Consent Required' and 'online HS students only'.

Class#	Sub	Sem	Aug 23	Wtr 24	Spr 24	Sum 24	Sec	GS	Cr	Course Title	Status	Enroll Count	Enroll Limit	Waitlist	Fee	Meeting Time	Classroom	Instructor	Campus	Video	Consent	Special Notes*	
1028	ENGR		121					A	2	Intro to Profession of Engr	Open	28	35			TR 10:00 - 10:50A	CSP154	Janice McKenzie, Natalie Smith-Gray	CP				
1029	ENGR		121					B	2	Intro to Profession of Engr	Open	19	35			TR 01:00 - 01:50P	CSP154	Natalie Smith-Gray, Janice McKenzie	CP				
1759	ENGR		121					C	2	Intro to Profession of Engr	Closed	6	0		\$150	ARR		Bryce Cole	CP	Video	Department Consent Required	online HS students only	
1145	ENGR			122					2	Intro to CAD	Open	39	60			T 01:00 - 01:50P		Delvin Peterson	CP				
1229	ENGR			122L				A	0	Intro to CAD Lab	Closed	16	16	2 in wait list	\$189	T 02:00 - 04:50P		Eduardo Ribeiro, Qin Ma	CP			Bio and Mechanical Topics	
1230	ENGR			122L				B	0	Intro to CAD Lab	Open	7	16		\$189	W 02:00 - 04:50P		Reserved Staff	CP			Civil Topics	
1231	ENGR			122L				C	0	Intro to CAD Lab	Open	5	16		\$189	R 02:00 - 04:50P		Eduardo Ribeiro, Qin Ma	CP			Bio and Mechanical Topics	
1387	ENGR			122L				D	0	Intro to CAD Lab	Open	10	16		\$189	W 02:00 - 04:50P		Ralph Stirling	CP			Computer and Electrical Top	
1132	ENGR			123				A	2	Intro to Engineering Design	Open	0	24		\$114	TR 10:00 - 10:50A		Ralph Stirling, Mark Haun	CP				
1174	ENGR			123				B	2	Intro to Engineering Design	Open	0	24		\$114	TR 01:00 - 01:50P		Ralph Stirling, Mark Haun	CP				
1776	ENGR			123				C	2	Intro to Engineering Design	Closed	0	0		\$150	ARR	ONLINE	Bryce Cole	CP			Online HS Students Only	
1834	ENGR		214						1	Aseptic Cell Culture Lab	Open	4	12		\$189	W 02:00 - 04:50P	RGH045	Janice McKenzie	CP				
1030	ENGR		221						3	Engineering Mechanics	Open	35	40			MWF 11:00 - 11:50A	CSP154	Delvin Peterson	CP				
1019	ENGR			222					3	Engineering Mechanics	Open	27	50			MWF 11:00 - 11:50A		Qin Ma	CP				
1013	ENGR			223					3	Engineering Mechanics	Open	1	50			MWF 11:00 - 11:50A		Reserved Staff	CP				
1031	ENGR		228						4	Circuit Analysis	Open	9	18			MWF 11:00 - 11:50A	CSP164	Natalie Smith-Gray	CP				
1014	ENGR			228					4	Circuit Analysis	Open	2	18			MWF 02:00 - 02:50P		Natalie Smith-Gray	CP				
1032	ENGR		228L						0	Circuit Analysis Lab	Open	9	18		\$189	W 02:00 - 04:50P		CSP317	Natalie Smith-Gray	CP			
1015	ENGR			228L					0	Circuit Analysis Lab	Open	2	18		\$189	W 03:00 - 05:50P		Natalie Smith-Gray	CP				
1791	ENGR		295						0	Sophomore Colloquium	Open	23	50			R 07:00 - 07:50P	KRH346	Doug Thomsen	CP				
1644	ENGR			318					4	Electromechanical Energy Conv	Open	11	18			MWF 11:00 - 11:50A T 10:00 - 10:50A		Rob Frohne	CP				
1645	ENGR			318L				A	0	Electromech Energy Conv Lab	Open	7	9		\$189	T 02:00 - 03:50P		Rob Frohne	CP				
1669	ENGR			318L				B	0	Electromech Energy Conv Lab	Open	0	9		\$189	T 04:00 - 05:50P		Rob Frohne	CP				
1033	ENGR		321						4	Mechanics of Materials	Open	20	24			MWF 09:00 - 09:50A	CSP154	Qin Ma	CP				

Current ClassOpen Interface

Roles

Julian

- Widget positioning
- Color palette
- Interface testing
- Use case testing

Ethan

- Separate applications
- Classes in client domain
- Data acquisition
- User generated schedules
- Backend/timing testing

Objectives

- Create a more modern interface
- Mobile/small screen friendly application
- Scheduling tool
- Save a schedule
- Application in a modern language

WWU Class Schedule

2370 classes found

Class	Subject	Sec	Day	Time	Sec	Inst	Class	Room	Days	Time	Class	Instructor	Course	Units	Comment	
1122	ACCT	201	A	US	4	Principles of Financial Acct	Open	48	50	0	30	WTFW 1:00PM - 12:00PM	BH1021	Brian Schaffner	CP	NALL
1123	ACCT	201	B	US	4	Principles of Financial Acct	Open	47	50	0	30	WTFW 1:00PM - 1:00PM	BH1021	Brian Schaffner	CP	NALL
1120	ACCT	202	A	US	3	Principles of Financial Acct	Open	5	46	0	30	WAFW 12:00PM - 12:00PM		Brian Schaffner	CP	NALL
1099	ACCT	202	B	US	3	Principles of Financial Acct	Open	2	46	0	30	WAFW 1:00PM - 1:00PM		Brian Schaffner	CP	NALL
1099	ACCT	203	A	US	3	Principles of Managerial Acct	Open	6	46	0	30	WAFW 12:00PM - 12:00PM		Brian Schaffner	CP	NALL
1099	ACCT	203	B	US	3	Principles of Managerial Acct	Open	6	46	0	30	WAFW 1:00PM - 1:00PM		Brian Schaffner	CP	NALL
1018	ACCT	236	US	2	Foundations of Income Tax	Open	2	30	0	30	WAFW 11:00AM - 11:00AM		Bruce Tones	CP	NALL	
1124	ACCT	301	US	4	Intermediate Accounting	Open	21	24	0	30	WAFW 10:00AM - 10:00AM	BH1010	Bruce Tones	CP	NALL	
1101	ACCT	302	US	4	Intermediate Accounting	Open	10	24	0	30	WAFW 10:00AM - 10:00AM		Bruce Tones	CP	NALL	
1090	ACCT	302	US	4	Intermediate Accounting	Open	8	24	0	30	WAFW 10:00AM - 10:00AM		Bruce Tones	CP	NALL	
1081	ACCT	331	US	4	Managerial Cost Accounting	Open	10	24	0	30	WTFW 2:00PM - 2:00PM	BH1021	Brian Schaffner	CP	NALL	
1094	ACCT	335	US	4	Personal Income Tax	Open	14	30	0	30	WAFW 11:00AM - 11:00AM		Bruce Tones	CP	NALL	
1102	ACCT	341	US	4	Accounting Info Systems	Open	8	28	0	30	WTFW 2:00PM - 2:00PM		Bruce Tones	CP	NALL	
1094	ACCT	360	US	4	Not for Profit and Govt Acct	Open	6	30	0	30	TR 2:00PM - 4:00PM		Bruce Tones	CP	NALL	
1100	ACCT	400	US	4	Auditing	Open	7	24	0	30	TR 2:00PM - 4:00PM	BH1010	Bruce Tones	CP	NALL	
1002	ACCT	451	US	4	Business Taxation	Open	7	24	0	30	TR 2:00PM - 4:00PM		Rebecca Duff	CP	NALL	
1014	ACCT	490	A	US	1.4	Internship	Closed	0	0	0	30	486		Bruce Tones	CP	NALL
1015	ACCT	490	B	US	1.4	Internship	Closed	7	0	0	300	486		Bruce Tones	CP	NALL
1017	ACCT	490	A	US	1.4	Internship	Closed	1	0	0	30	486		Bruce Tones	CP	NALL
1018	ACCT	490	B	US	1.4	Internship	Closed	0	0	0	312	486		Bruce Tones	CP	NALL
1030	ACCT	490	A	US	1.4	Internship	Closed	0	0	0	30	486		Bruce Tones	CP	NALL
1031	ACCT	490	B	US	1.4	Internship	Closed	0	0	0	312	486		Bruce Tones	CP	NALL
1038	ACCT	490	A	US	1.4	Internship	Closed	0	0	0	30	486		Bruce Tones	CP	NALL
1039	ACCT	490	B	US	1.4	Internship	Closed	0	0	0	312	486		Bruce Tones	CP	NALL
1002	ACADM	700	US	3-70	Academics Courses	Closed	10	0	0	30		TBA		Bruce Tones	CP	NALL

General Changes to UI

- Search criteria moved
- Font sizes adjusted
- Added checkbox
- Schedule page created


“Wide” View

- Table columns simplified

WWU Class Schedule												
	Class#	Subject	Sum 23	Aut 23	Wtr 24	Spr 24	Sum 24	Sec	GS	Cr	Course Title	Status
<input type="checkbox"/>	1122	ACCT		201				A		4	Principles of Financial Acct	Open
<input type="checkbox"/>	1123	ACCT		201				B		4	Principles of Financial Acct	Open
<input type="checkbox"/>	1100	ACCT			202			A		3	Principles of Financial Acct	Open
<input type="checkbox"/>	1099	ACCT			202			B		3	Principles of Financial Acct	Open
<input type="checkbox"/>	1089	ACCT				203		A		3	Principles of Managerial Acct	Closed
<input type="checkbox"/>	1088	ACCT				203		B		3	Principles of Managerial Acct	Open
<input type="checkbox"/>	1418	ACCT			235					2	Fundamentals of Income Tax	Open
<input type="checkbox"/>	1124	ACCT		321						4	Intermed Accounting	Open

“Medium” View

- Column count reduced



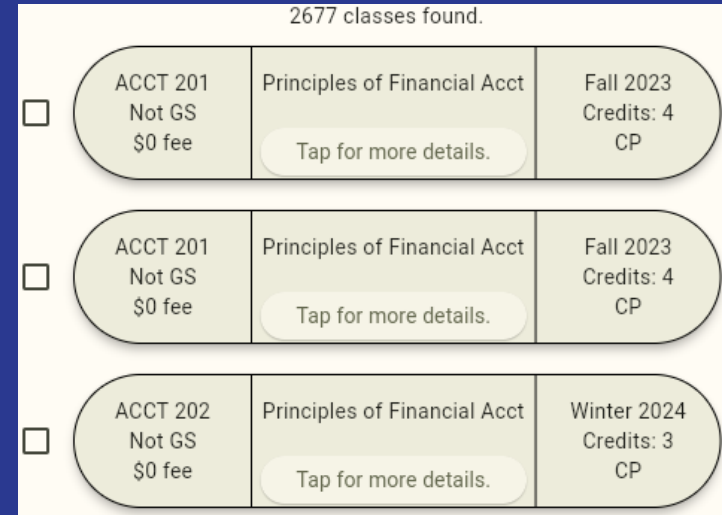
WWU Class Schedule

2677 classes found.

Class #	Subject	Sec	Term	Title	Cr	GS
<input type="checkbox"/> 1122	ACCT 201	A	Aut 2023	Principles of Financial Acct	4	
<input type="checkbox"/> 1123	ACCT 201	B	Aut 2023	Principles of Financial Acct	4	
<input type="checkbox"/> 1100	ACCT 202	A	Wtr 2024	Principles of Financial Acct	3	
<input type="checkbox"/> 1099	ACCT 202	B	Wtr 2024	Principles of Financial Acct	3	
<input type="checkbox"/> 1089	ACCT 203	A	Spr 2024	Principles of Managerial Acct	3	

“Small” View

- Data compacted
- Colors adjusted
- Rows remodeled



2677 classes found.

<input type="checkbox"/>	ACCT 201 Not GS \$0 fee	Principles of Financial Acct	Fall 2023 Credits: 4 CP
<input type="checkbox"/>	ACCT 201 Not GS \$0 fee	Principles of Financial Acct	Fall 2023 Credits: 4 CP
<input type="checkbox"/>	ACCT 202 Not GS \$0 fee	Principles of Financial Acct	Winter 2024 Credits: 3 CP

Schedule View

- Automatically checks for schedule conflicts.
- Shows data in a quarter-by-quarter view, defaulted to fall quarter.
- Shows saved classes and allows you to download those classes.

WWU Class Schedule

Term: Fall 2023

	Sun	Mon	Tue	Wed	Thu	Fri
7:00AM						
8:00AM						
9:00AM			AUTO 214		AUTO 214	
10:00AM						
11:00AM						
12:00PM						
1:00PM						
2:00PM						
3:00PM						
4:00PM						
5:00PM						
6:00PM		BIOL 440	ANTH 225 BIOL 440L	BIOL 440		
7:00PM		BIOL 440	ANTH 225 BIOL 440L	BIOL 440		
8:00PM			ANTH 225			

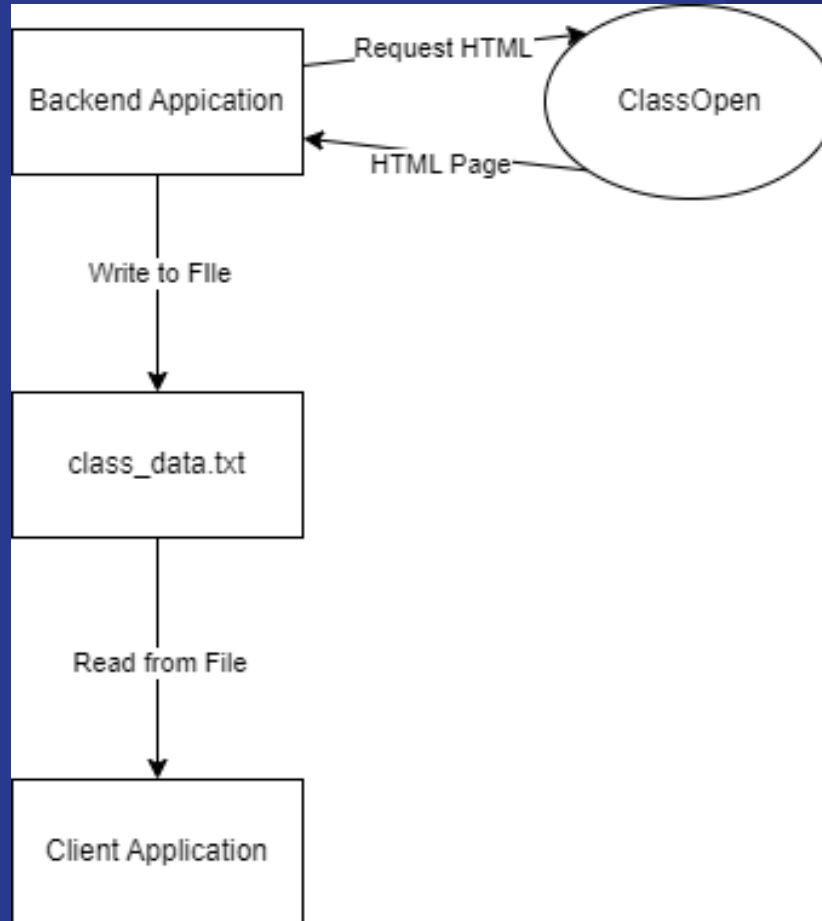
Class#	Subject	Sun 23	Aut 23	Wr 24	Spr 24	Sun 24	Sec	GS	Cr	Course Title	Status	Count	Limit	Waitlist	Fee	Meeting Time	Classroom	Instructor(s)	Campus	Video	Consent
✓ 1126	ANTH	225						GS	4	Cultural Anthropology	Closed	20	20	0	50	T 6:00PM - 8:50PM	ONLINE	Jonathan Ortiz	CP	NULL	
✓ 1139	AUTO	214						GS	2	Engine Performance	Open	6	10	0	50	TR 9:00AM - 9:50AM	CTC126	James Veverka	CP	NULL	Department Consent Required
✓ 1892	BIOL	440						GS	4	Human Anatomy	Open	7	24	0	3649	MW 6:00PM - 7:30PM	RGH220	Tess Saruk Craig	CP	NULL	
✓ 1893	BIOL	440L					A	GS	0	Human Anatomy Lab	Open	7	20	0	50	T 6:00PM - 7:30PM	RGH205	Tess Saruk Craig	CP	NULL	

All Classes

Schedule

Hierarchy

- CORS concerns
- Two applications
- Static data location



Backend Application

- Periodic screen-scraping
- Intake and parsing
- Saving to the static file

```
void main(List<String> args) async {
  data = await getSchedule();
  //Change path based on hostname
  final file = File('/var/www/html/class_data.csv');
  // ignore: unused_local_variable
  var dataFile = await file.writeAsString(data);
  const fiveMin = Duration(minutes: 5);
  Timer.periodic(fiveMin, (timer) async {
    await dataStream();
    dataFile = await file.writeAsString(utf8.encode(data) as String);
  });
}
```

Generating Schedules

- One function for downloads
- One function for uploads
- Creates a CSV with headers for important information about each class
- Uses the 'saved' boolean the students schedules

```
void reloadSavedClasses(String scheduleCSV) {  
    final list = const CsvToListConverter().convert(scheduleCSV);  
    for (final element in Class.instances) {  
        for (int i = 0; i < list.length; i++) {  
            if (element.classNumber.toString() == list[i][0] &&  
                element.course.title == list[i][2]) {  
                element.saved = true;  
            }  
        }  
    }  
}
```

Class Number	Subject	Class name	Time		
1523	Biology	Contemporary Biology	MWF 8:00AM - 8:50AM		
1157	Chemistry	General Chemistry Lab	W 2:00PM - 4:50PM		
1887	Aviation	Remote Pilot Ground School	T 9:00AM - 10:50AM		
1144	Biology	Anatomy & Physiology	MWF 10:00AM - 10:50AM		
1156	Chemistry	General Chemistry	MWF 11:00AM - 11:50AM		

Timings

- Timing tests done using dart:Stopwatch
- All on same system with as many tasks closed as possible
- Times in ms

ClassOpen Response Times	ClassOpen Response Avg	Parse Times	Parse Avg	Server Response Times	Response Avg	File Read Times	Read Avg
1221	1307	787	534	9	14	9	8
1181		574		16		11	
1311		515		12		9	
1335		535		35		17	
1878		492		12		5	
1311		482		13		7	
1247		502		12		5	
1092		492		16		8	
1239		514		10		6	
1256		451		9		5	

Timings cont.

- Two Application system decreases processing time by over 99%
- Static file sees a further ~43% reduction in time

Local Processing Time	Server-Client Time	%Improvement Over Local Processing	
1841	14	-99.24%	
File-Read Time	%Improvement Over Local Processing	%Improvement over Server-Client	
8	-99.57%	-42.86%	

Test Driven Development and Cost

- New features and methods get tests to go along with them
- Bug fixes also get tests
- Only cost is some shared CPU time on a server

Front-End Challenges

- Learning how Flutter works
- Choosing what data is necessary
- Figuring out how to format data
- Decluttering each view
- Testing taking longer than expected
- Semantics issues

Back-End Challenges

- Security concerns
- Parsing and server design
- Design changes throughout development

Future Work

Front-End

- Ensure that the interface has the least amount of clutter as possible.
- Keep the color palette to retain ADA compliance.
- Multi-year schedule

Back-End

- Speed improvements
- Direct access to school's API
- Search results based on major

Misc.

- Try to make gitlab pipeline faster.

- ...Make the loading wheel smaller.

Demo

<https://schedule.cs.wallawalla.edu>

References

<https://classopen.wallawalla.edu>

<https://schdeule.cs.wallawalla.edu>

<https://flutter.dev>

<https://dart.dev>