

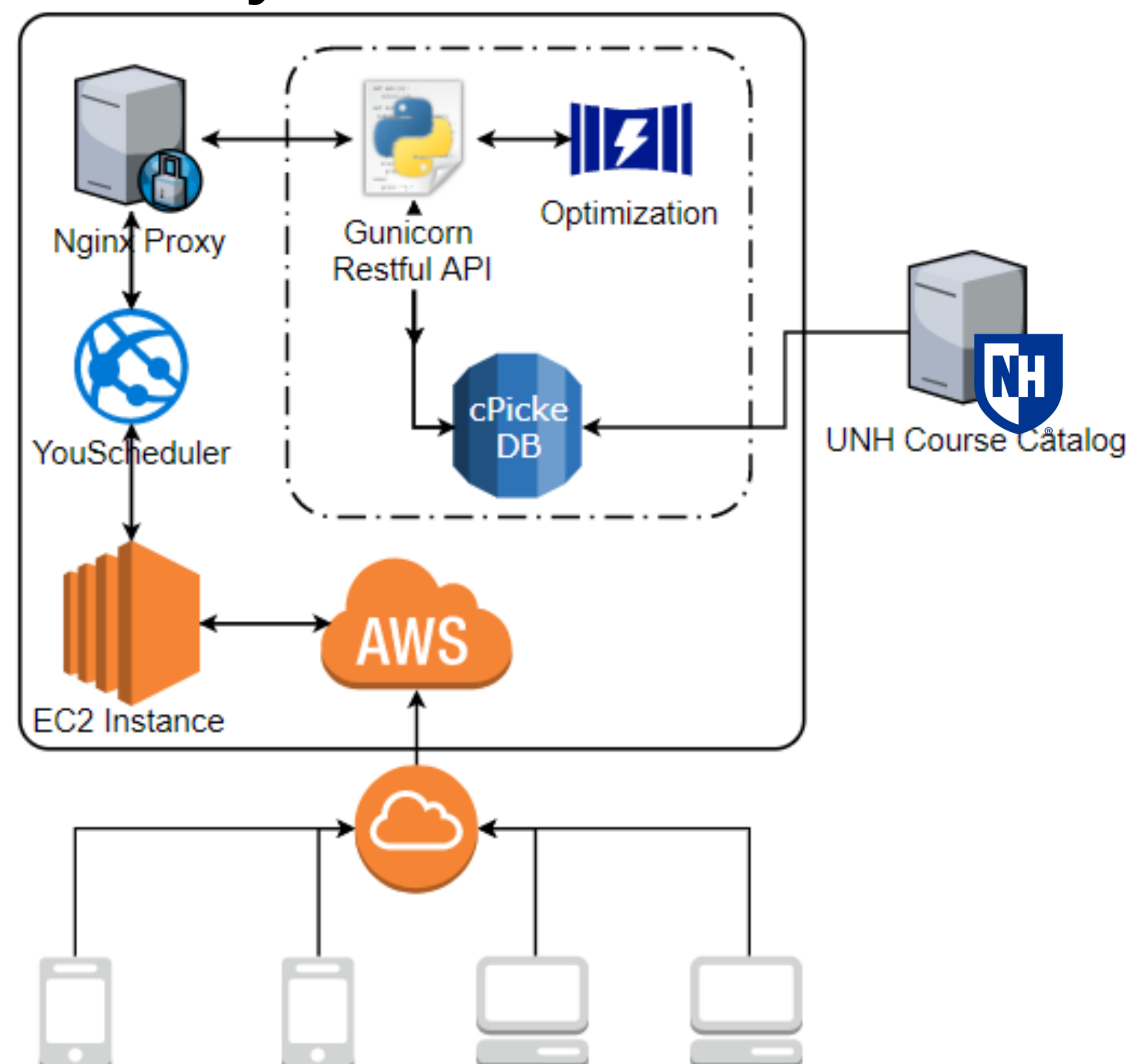
## Problems

- UNH doesn't currently offer any tools to assist students in building their schedule
- Every semester students spend hours planning courses around their commitments
- During meetings, academic advisors waste time evaluating potentially conflicting courses
- This problem is exacerbated for freshman, as they enroll in courses with up to 50 sections

## Goals

- Find all possible non conflicting schedules
- Visually display potential weekly schedules
- Reduce the time to create course schedules
- Simplify creating a schedule around extracurricular activities (e.g. work)
- Empower advisors to instantly suggest schedules

## System Architecture



**Create Your Schedule**  
 7 simple steps

- School**: UNH DURHAM
- Semester**: FALL 2018
- Courses**:
  - REQUIRED: ENGL 401\*, PHYS 407S\*
  - Course 1: MATH 425
  - Course 2: ECON 401
  - Course 3: ENGL 401
  - Course 4: CS 415
- Work / Breaks**: Breakfast (8:00AM - 9:00AM)
- Course Restrictions**: ALLOW RESTRICTIONS
- Time Preferences**: Before 4pm
- Search**: Find your best schedule!

**Potential Restrictions:**

- 10248: Only listed colleges in section: Engineering&Physical Sciences
- 13933: Only listed campus in section: Durham
- 10291: Only listed colleges in section: Engineering&Physical Sciences

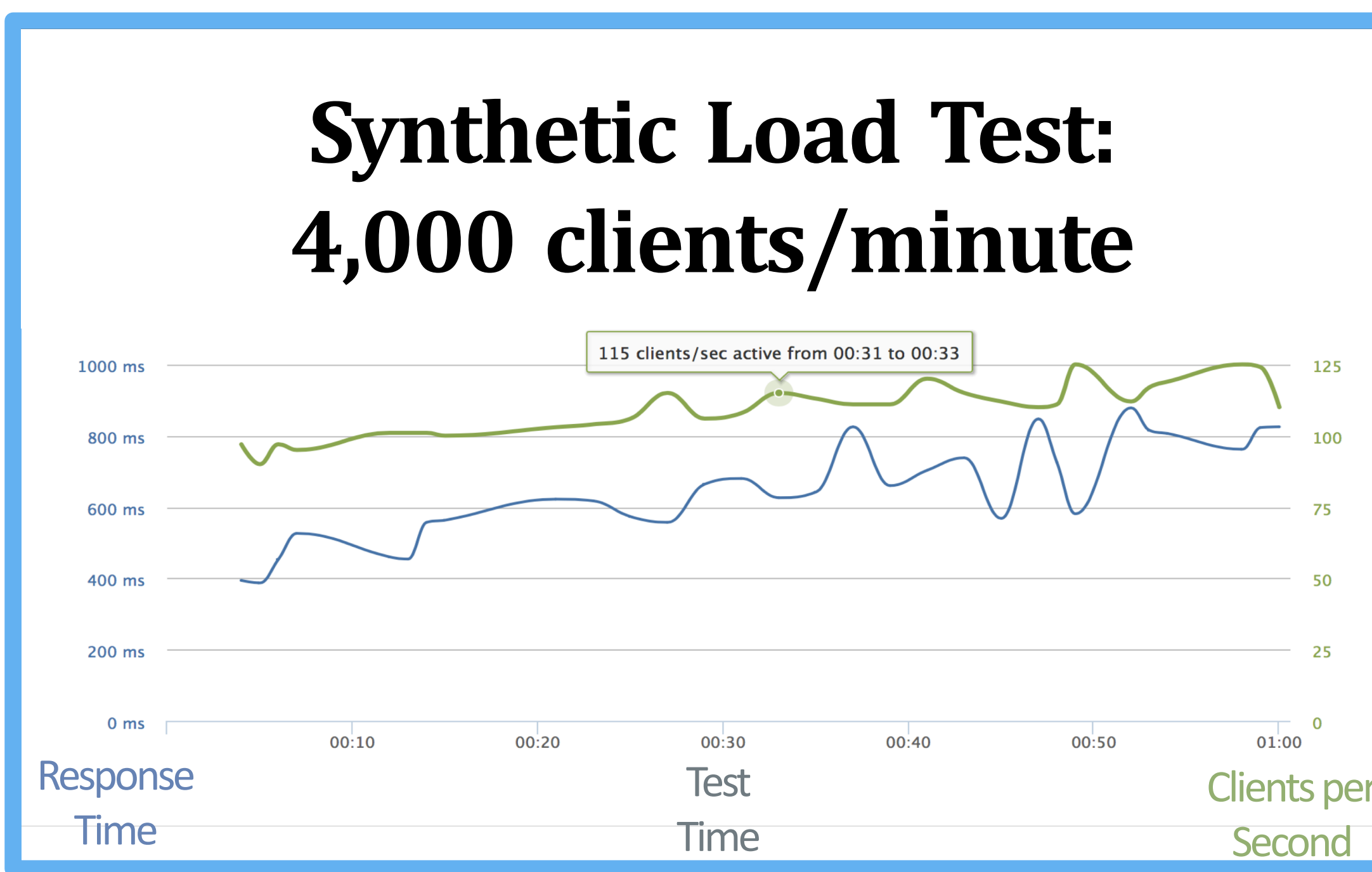
CRN	Course	Instructor
10248	MATH 425 (06)	Rita Hibschiweiler
13933	ECON 401 (09)	Marco Vincenzi
10291	CS 415 (01)	Mark Bochert
11700	CS 415 (L04)	Mark Bochert
10050	ENGL 401 (04)	Lawrence Beemer

**Weekly Schedule Grid:**

	Mon	Tue	Wed	Thu	Fri
8am	BREAKFAST	BREAKFAST	BREAKFAST	BREAKFAST	BREAKFAST
9am	MATH 425 (06)   PARS N108	CS 415 (L04)   KING N218	MATH 425 (06)   PARS N108	CS 415 (L04)   KING N218	MATH 425 (06)   PARS N108
10am	ECON 401 (09)   PCBE G75	ENGL 401 (04)   HS 124	ECON 401 (09)   PCBE G75	ENGL 401 (04)   HS 124	ECON 401 (09)   PCBE G75
11am					
12pm					
1pm	CS 415 (01)   CHASE 105	MATH 425 (06)   KING N310	CS 415 (01)   CHASE 105	MATH 425 (06)   KING N310	CS 415 (01)   CHASE 105

**Monday**

- 9am: ECE 962-01 (10:12 Class), 9:10 am-10:00 am (KING N310)
- 10am: MATH 425-06 (11:02 Class), 11:00 am-12:00 pm (HS 148)
- 11am: MATH 425-06 (11:02 Class), 11:00 am-12:00 pm (HS 148)
- 12pm: MATH 425-06 (11:02 Class), 11:00 am-12:00 pm (HS 148)
- 2pm: CS 415-01 (12:40 Class), 12:40 pm-2:00 pm (KING N310)
- 3pm: MATH 425-06 (11:02 Class), 11:00 am-12:00 pm (HS 148)
- 4pm: MATH 425-06 (11:02 Class), 11:00 am-12:00 pm (HS 148)



**Front End:** jQuery, Bootstrap, JS, HTML, CSS, End-User, Full Calendar

**Back End:** AWS, Flask, python, NGINX

## Analysis

- Randomization approach ensures better distribution of students across sections
- All non-conflicting courses is an NP-Problem (Nondeterministic Polynomial Time):
- Let average # of sections in each course  $s = 10$

Complexity	# of courses
Cases	4, 5, x
O(AVG)	$10^3$ , $5 \times 10^3$ , $\frac{s+1}{2}$
O(WORST)	$10^4$ , $10^5$ , $(s)^x$

Graph showing combinations vs. courses. The 'worst' curve is exponential, while the 'avg' curve is polynomial.

## Features

- Serve over 50 clients/second
- Instantly view multiple personalized schedules
- Save optimal solutions without accounts
- Randomized search for best availability
- Automatic inclusion of labs / co-requisites

## Solution

- Resolved NP-Complexity with a thoroughly optimized brute force approach
- Flask & Gunicorn multi-workers, multithreading
- Maintaining minimal data to optimize run-time
- Average solution requires < 50KB of RAM
- Publicly deployed alpha in December 2017

## Current Status

- UNH administration is piloting the deployment
- Over 100 daily users actively use YouScheduler
- Daily release of requested key features
- Participating in the Holloway Competition

## Next Steps

- Expand support to more universities
- Develop an intelligent web scraper for course catalogs, allowing our service to expand rapidly
- Continue optimizing the process by creating a standard data format for the calendar events
- Implement an AI-like smart algorithm able to rank schedules, based on search criteria