CSPB Pathways

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Project

Purpose:

Give students a tool to help create a balanced schedule, ensure they can take their first-choice electives, and get valuable data and insights on the courses they will be taking throughout the program.

Major features:

To do this, we implemented a schedule generator that allows students to input their own information and preferences in order to receive a customized schedule for one or more semesters. We also implemented a review system for students to leave comments on classes, rate the courses, and leave helpful feedback on the difficulty and time commitments that the course demands from students.

Design & Team Challenges

- Full pathway generator vs available semesters generator
  - Course offerings are unknown beyond Spring 2024
- Planning ahead vs one semester at a time
  - Not all schedules are as balanced as they could be
- People working on multiple versions of the same task
  - Then being tasked with integrating those two versions
- Time zones
  - Struggled to find meeting times that worked for everyone

Tools: Project Tracking and Version Control

Trello

- Project tracking, sharing ideas, and organizing to-do lists
- This was updated about every two weeks, but wasn't used regularly by the team.
- Out of sight, out of mind
- Usefulness - ⅖
- Ease of use - ⅘

GitHub

- Hosting and version control
- Seamless collaboration
- Easy and convenient
- Simple use despite its power
- Usefulness - 5/5
- Ease of use - ⅘

Tools: Communication and Development

- Discord
  - Ease of use - 5/5
  - Usefulness - %
  - Convenient way for all of us to communicate regularly
  - Helpful with time zone differences

- Agile Development
  - How it went: 3/5
  - Easier to use with frontend and backend
  - Algorithm: works or it doesn't
  - Testing regularly as a team was handy

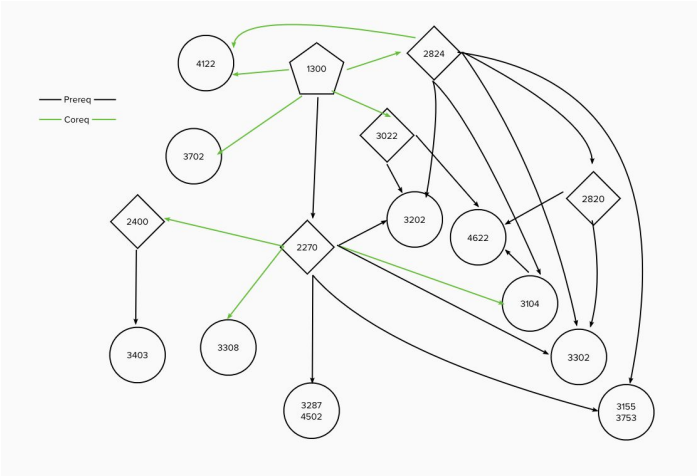
Tools: Planning

- Jotform
  - Ease of use - ⅗
  - Usefulness - ⅘
  - Essential for finding balance
  - Not enough feedback on some electives

How many hours did you spend on each core class each week?

Computer Science 1	5-10 hours
Discrete Structures	15-20 hours
Data Structures	10-15 hours
Algorithms	20+ hours
Software Development	10-15 hours
Computer Systems	20+ hours
Principles	

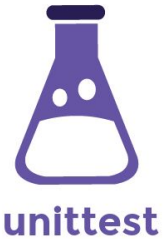
- For visualizations and planning
  - Ease of use - ⅘
  - Usefulness - 5/5
  - Valuable for being able to make quick connections between courses



Tools: The Algorithm

- Python as the sole programming language
  - Ease of use - 5/5
  - Usefulness - 5/5
  - Easy to amend and break into smaller parts

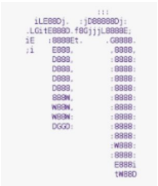
- Python and unittest
  - Ease of use - 4/5
  - Usefulness - 5/5
  - Easy and quick to build more tests
  - Fundamental in perfecting the algorithm



Tools: Editors

- VS Code
  - Ease of use - 5/5
  - Usefulness - 5/5
  - Simple and fast debugging
- Sublime
  - Ease of use: 4/5
  - Usefulness: 4/5
  - We used this for simple edits such as HTML pages and CSS

- Vim
  - Ease of use - 4/5
  - Usefulness - 5/5
  - We used this to add comments when there were conflicts in GitHub and we needed to merge



- Nano
  - Ease of use: 5/5
  - Usefulness: 5/5
  - We used Nano when we weren't using Vim to make changes on the command line to files. Nano is just easier to use, even if Vim is more powerful.

Project

Database Design: Flask SQLite

Testing: python unittest for algorithm and database

Documentation: Project plans, explanations of how the algorithm works, how to get it running locally, and how you can get it running on Heroku

Tools: Frontend

- HTML & CSS
  - Ease of use - 5/5
  - Usefulness - 5/5
  - HTML: render_template - Use the power of object oriented programming to use inheritance property and not rewrite code

```
my-flask-app
├── static/
│   └── css/
│       └── main.css
├── templates/
│   ├── about.html
│   ├── plan.html
│   ├── review.html
│   └── contact.html
└── cspbAlg.py
```

- CSS
  - CSS is used to add padding, margin text and background color for header, body and content.

- Bootstrap
  - Ease of use - 5/5
  - Usefulness - 5/5
  - Bootstrap make it easier to have our site work on multiple platforms and web browsers.

- WTForms
  - Ease of use - 5/5
  - Usefulness - 5/5
  - WTForms allows you to create web forms and deploy them in templates easily.
  - combined with Bootstrap

Tools: Backend

- Python
  - Ease of use: 5/5
  - Usefulness: 5/5
  - Python with Flask is a simple way to create a web application.
- Flask Database Models
  - Ease of use: 5/5
  - Usefulness: 5/5
  - Flask Models (from SQLAlchemy) is the easiest way to create tables in a database. We also used a migrations tool installed in pip that will migrate any changes we make to the database.

Flask

- Flask forms
  - Ease of use - 5/5
  - Usefulness - 5/5
  - Flask forms make it easier to check the data before it is sent in a POST. It also is easier to make HTML forms this way than manually..
- Flask templates
  - Ease of use - 5/5
  - Usefulness - 5/5
  - Flask templates make it easy to create HTML pages that inherit from the base and not have to recreate pages.

Tools: Database

- Ease of use - 5/5
- Usefulness - 5/5
- SQLAlchemy is useful because it works with multiple types of databases. We used it to test with SQLite locally then switched it to Postgresql in Heroku. By using SQLAlchemy, we didn't need to make any changes to the Python code.

- Ease of use - 5/5
- Usefulness - 5/5
- All initial testing and unit testing were done locally with SQLite.

Tool: Deployment

HEROKU

- Deployment Environment
- Ease of use - 4/5
- Usefulness - 5/5
- Heroku was incredibly easy to work with. The only issue was setting up the Procfile and getting SQL Alchemy to work with Heroku.

- Ease of use - 5/5
- Usefulness - 5/5
- Using PostgreSQL was an easy switch from SQLite (used for testing locally). The only change was to update the database in config.py to Heroku's settings.

Future Improvements

- Display the reviews and class schedule with more information and more professionally
- Improve CSS, update to CU colors
- Password reset by email
- Save multiple schedules by updating to a more sophisticated database
- Multiple hour options per schedule
- Gather average hours from reviews to put into algorithm