

Part A: Planning

Defining the Problem

The problem that my client has is planning a yearly carpool schedule for multiple drivers. My client relies on carpooling for transportation to school for her kids and has been carpooling on a yearly basis since 2014. As my client told me, “Through the many carpools that I have been a part of, one of the biggest challenges is creating a schedule,” (Appendix A).

The Scenario

My client says that it is very difficult for a carpool to not use a schedule as drivers can’t just simply alternate days or weeks due to the unruly school schedule. Tracking turns and evenly dividing them is also almost impossible to do without a schedule. My client and her carpool members have tried using Google Sheets or Excel to make the schedule, but my client says that “creating the schedule can be very time consuming,” (First Client Interview). This large time commitment is again due to the unruly school schedule, but the carpool currently likes to use spreadsheets for its readability, as my client said. I thus proposed a Carpool Scheduler that will take a list of school Holidays/Teacher Workdays and output the schedule in a readable format. After this, my client also mentioned that each driver has preferred days that they like to drive, which is something that will also be incorporated into the program.

Rationale for Solution

My solution avoids the manual scheduling that my client found time consuming. With the solution, my client can simply input the days that each driver wants to drive and the days that school is off and receive a schedule to follow for the year. This program will further be helpful as it can automatically count the days that a driver is assigned and make even distribution much easier. I will be using Java to code this as I plan to work with objects. I will definitely need a

Driver object that at least contains preferred days, a turn count, and a list of assigned days. The output can also be simply printed by week with each day and assigned driver separated by a space and each week separated by a new line; thus, a programming language with a visual display will not be needed. I can also import a file of days where school is off into Java, fulfilling another of my client's requirements.

Success Criteria

1. The program can read the first and last day of the schedule and calculate the total days.
2. The user can input a file of days of weekdays where they do not need the carpool.
3. These days are not included when filling in the schedule.
4. The user can input their driver's name and preferred days.
5. The user can input as many drivers as they need to.
6. Each driver has a counter that tracks the number of turns that they have been assigned.
7. A schedule is set up from the week of the first day to the week of the last day.
8. The schedule can be filled and every day that is not a weekend or is not included in the file of days off is assigned a driver.
9. The full schedule is printed out in a readable format. This means that there is a new line between every week and there is sufficient distance between the days.

Appendix A

First Client Interview

Developer: Good morning Ms. M. For my computer science internal assessment, I need to create a solution to a client's real world problem. I know that you have driven carpools with other parents for your kids' schools for years now and that planning a carpool can be a hassle. What types of issues do you face?

Client: Through the many carpools that I have been a part of, one of the biggest challenges is creating a schedule.

Developer: How have you dealt with this challenge in the past?

Client: Some years the carpool has chosen to use Excel or Google Sheets to make the schedule and other years the carpool has chosen to go without a schedule. If the carpool chooses to not use a schedule, each driver chooses a day of the week or drivers alternate week. If the carpool chooses alternate days but does not have five drivers, then extra days also have to be assigned, which can cause confusion. On top of that, schools have many Teacher Workdays or Holidays which causes the calendar to be unruly and make it even harder to work without a schedule.

Developer: There does seem to be a significant number of complications with not using a schedule.

Client: Yes, and one of the major problems we face is tracking who has driven how many turns. Ideally, we want an almost equal number of turns distributed between the drivers, but this is hard to do without a schedule.

Developer: I see. In years that you have used Excel or Google Sheets to create a schedule, was it easier to have almost equal turns and was the carpool less confusing.

Client: It was less confusing, but creating the schedule can be very time consuming. Whoever creates the carpool schedule first needs to copy down the school schedule into the spreadsheet and only then they can start assigning turns. They still also do have to manually count how many turns each driver has and then do their best to even out.

Developer: Are there any benefits or using spreadsheets to plan your schedule?

Client: The main benefit is readability as it's easy to look at a screenshot of the spreadsheet every morning and know when I have to drive or who else is driving.

Developer: You have mentioned that creating a schedule even with spreadsheets can be time consuming. How much time does it take to create a spreadsheet?

Client: It can take 2-3 hours to create a spreadsheet for the entire year. Many times, the person creating the schedule chooses to only do it for one quarter of the school year at a time, but this can again lead to confusion.

Developer: I think that a program that creates a carpool schedule for the entire year and takes into account the unruly school calendar can make the schedule-creating process much less time intensive.

Client: That sounds like it would benefit all the drivers. There is one other consideration that is important when creating the carpool schedule.

Developer: What is it?

Client: Many drivers have days that they prefer to drive. This is especially true since the pandemic, as many of the other parents now have consistent work-from-home days each week. There are also other reasons that a driver cannot drive on a certain day of the week, so it would be helpful if day preferences can be set in the program.

Developer: I can find a way to make that work. Is there anything else you want the program to be able to do?

Developer: Ok, I will make a list of criteria for the program and review the criteria with you at the next meeting.

Second Client Interview:

Developer: Hi, I have created some success criteria for the Carpool Scheduler. Is there anything else you would like to add or modify?

Client: Looks good to me.

Developer: Nice. Have you thought about which platform you would like to use? As this program will very likely be a once-per-year use, I think that a simple web application with text output will be sufficient.

Client: Just to clarify, how will you display the schedule with a text output?

Developer: For each day of the week, either the name of the driver or something that signifies that the day is not a school day will be outputted. Then each week will be printed on a new line so that the schedule is easily followable. You can copy and paste the schedule or take a screenshot to use throughout the year. This was how I was planning on outputting the schedule, but does it work for you?

Client: Hmm. I think that will work for me. The past two years, the carpool has used screenshots of the Excel spreadsheet and there have been no problems with using screenshots.

Developer: How do you feel about a web-based application then?

Client: I definitely don't want to install an application for, as you said, a once-per-year use so I think that a web-based application is the best option.

Developer: Thanks for your feedback! I'll create a prototype for the Carpool Scheduler and show it to you next time.

Client: Thanks so much, I'm looking forward to seeing it!