1. We have chosen to work on addressing the issue of lack of a degree planner amongst NUS students, particularly freshmen. It is an important issue as NUS students currently lack the means and direction to craft their own degree planner, and information websites across faculties are packed with information, leading them to be daunting and difficult to access for students. This is especially the case for freshmen, who are not used to NUS academic protocol and thus struggle with identifying the direction to achieve their academic goals. Given that most freshmen enter the university without having experienced such a large degree of freedom that universities provide in terms of academic goals, tasks such as crafting their own timetables and degree planners can be very challenging for them without the proper guidance. NUSMODS has greatly helped in solving that problem by providing a timetable template and module lists for students. Now, it's time for us to help solve the latter part of the issue; by providing a similar template to NUSMODS's, but for the purpose of providing an easy degree-planning template for students, especially freshmen, to craft out their university academic journey.

2. The app is expected to offer a variety of degrees for users to choose from. Depending on the selected degree, the app will load the respective degree requirements and the courses recognized by the corresponding major. To address the needs of the target users—freshmen—and help them visualize their degree progressions, the app is designed to present 8/10 rows (depending on the candidature of the chosen degree), each representing one semester. Within each row, 1-10 small units will denote individual courses. Clicking on a unit will display the department's recognized or offered courses in a dropdown list. Students can choose courses for each semester and finally see all the courses they wish to take and how they can take them during their 4-5 years of study. In addition to these basic functions, the team envisions introducing advanced features, pending sufficient resources and time. First, the app should give a warning to the student if the graduation requirements are not met. For instance, if a student fails to choose enough 4000 level courses, the app will indicate that graduation is unlikely and prompt the user to review their choices. Second, with enough data, the app could provide feedback on course prerequisites. If a student selects a course with a prerequisite without choosing the prerequisite in earlier semesters, the app will prompt the user to make the necessary adjustments.
Due to resource and time constraints, the app will have limitations. Firstly, it won't be able to create degree plans for all existing majors at NUS due to the vast number. Secondly, special programs such as NUSC or double degrees are not included at this stage due to the extensive data and effort required. Nevertheless, the team still expects the app to mitigate the problem, to serve as a preliminary prototype, representing the initial step towards addressing the lack of a degree planner in NUS.

3. A sorting algorithm can be applied to create a course plan for a student by organizing courses in a sequence that satisfies prerequisite dependencies. The most effective one would be a topological sorting algorithm, where each course is represented as a node in a directed graph, with "indegrees" (arrows towards it) indicating prerequisites (See Figure 1).

Figure 1: Flowchart of topological sorting algorithm that the app will adopt to suit our needs.

By performing topological sorting on this graph, a sequential order of courses is obtained, ensuring that all prerequisites are completed before advancing to more advanced courses. This ordered list guides the student in planning their course schedule, ensuring a structured progression through the curriculum.

A simple summation algorithm that adds up all the units from courses taken will provide the total number of

units and check this against the graduation requirements (total, faculty, major, UEs, etc). In essence, the workload difficulty required for the app to be coded might actually be rather high, ranked an 8/10, for we envision the app to include a wide range of pathways and thus have to include many arrays into our algorithms, taking into account our group's coding ability (which isn't high), this might be another spanner in the works. (i wanna toss in the towel)

4. Given the functions in our app, we expect users to frequent our app in between semesters/before each semester as we aim to provide a one-stop course planning app that students might find helpful during the stressful times of bidding and exploring the countless courses offered across all faculties in NUS. The compactness of our app – equipped with many relevant functions in one – permits mobility, accessibility and efficiency; users are able to access course information and personal academic records whenever and wherever, with just a few clicks on their mobile devices, hassle-free.

Our target demographic would be undergraduate students – especially freshmen – from NUS. Prospective students of NUS can also utilise some functions of the app to explore how their diverse interests can be pursued in academia at NUS through the offered courses.

Users of our app might find some functions in our app redundant as we adopt information from different sources that students can access and retrieve information from. For example, students are able to track their module credits through EduRec when they download their academic transcript. Though so, due to the limitations we face with data collection, we will be prioritising the UI/UX aspect of accessing these information, creating an app with a cleaner interface for when students want an easy and quick glimpse into their academic progress, as well as a convenient and efficient means to plan their degree.

Resources:
Explanation of topological sorting algorithm:
https://wangyy395.medium.com/course-schedule-and-topological-sorting-7deac2802053
https://www.interviewkickstart.com/learn/topological-sort
Topological sorting algorithm used in course scheduling:
https://www.interviewkickstart.com/problems/course-schedule-ii
Study on Automatic Study Plan Generator using algorithms:
https://thesai.org/Downloads/Volume13No8/Paper_47-Automated_Study_Plan_Generator.pdf