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ISE 3230 Project Proposal

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<div align="center">OSU Meal Plan Optimization</div>

OSU's meal plans have changed quite a bit over the last several years, going from a declining balance system to a "pick an entree, side, and drink" system, to the current "swipe" / "visit exchange" system. Each visit exchange is $8 of credit at a campus restaurant, and any part of the swipe left unspent during each visit is lost to the student. Additionally, a declining balance of both Dining Dollars and BuckID cash is included in the meal plan that can be used on on-campus restaurants. However, the money cannot be directly translated back into cash; BuckID cash must be spent by graduation or it will be lost, and a Dining Dollars balance of $10 or greater can be refunded by OSU for a processing fee of $5. Therefore, it is most efficient to use the greatest extent possible of every swipe, as well as both of the declining balances, while a student at OSU.

Using a variation of the Knapsack Problem, Integer Programming techniques can be used to find an optimal "spending plan" to maximize the proportion of money spent on food out of any given initial balance. The cost function to be maximized, Z, will be the amount of money spent on food, under the constraint that the amount does not exceed the amount available to the user.

The Integer Programming model will be accessible through a Python program that allows users to enter any number of swipes, or any Dining Dollar / BuckID balance of their choosing. A model will be created using real OSU food items and prices as of the AU22 that will use the budget most efficiently. The list of items the user can purchase will be filtered down to those with non-zero quantities, and then the item's name and total price will be displayed.