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## Purpose

The purpose of this project is to produce a program which will accurately search for restaurants in Soho based on the food type.

## Search for Food Types

The first task was to write code to search for the food types in a list called ‘types’ by typing in the beginning of the food type.

Rather than opting for a single letter approach, the code allowed for any number of letters to be typed from the beginning of the food type.

This was achieved by defining a function that creates a new hash map every time the function is called.

The function accepts the search texts as the only input. It takes the length of the search text and creates a hash map for each food type using the same number of letters of the search text as the key and the full food type as the value.

It then uses the hash map to retrieve all matching values.

The hash map was used because it provided the data structure that suits searching text as it allows for key value pairs. It also allows for arrays to be stored as values so that multiple results with the same search query can be stored in the same key.

### Runtime in asymptotic notation

As the function only needs to iterate thought the list of food types once for every search the asymptotic notation would be Θ(N).

## Retrieve Restaurant Data

The second task was to write code to retrieve the restaurants that match the requested food type.

The code takes the result of the first section and if there is more than one result it will put those results in a new hash map and gives the user the option to select one of the return results.

Once one food type has been identified then to retrieve the restaurant information a hash map is created using the food type as the key and storing the other restaurant information as another hash map. This is essentially creating a multi-dimensional hash map.

A hash map was used because you can achieve multi-dimensional functionality to store multiple levels of information that can easily be retrieved with the key.

### Runtime in asymptotic notation

As the function only needs to iterate thought the list of restaurants once for every search the asymptotic notation would be Θ(N).

## Other innovative ways to utilize data structures

* Graphs: a data structure to find the fastest route between a and b such as satnavs
* Queues: can be used for a ticketing system at a fast food restaurant
* Stack: a stack can be used to record items being stored on warehouse shelfs
* Hash Map: Storing product details within a multi-dimensional hash map using the product id as the key