

# SE 420 Term Project

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## 1 Purpose

Artificial intelligence expert systems term project aimed to find the optimal result in the shortest period among the pre-determined cities of the target inventories.

## 2 About Algorithm

In the term project, Dijkstra shortest path algorithm implemented in code. Dijkstra algorithm provide to find shortest path between the cities. Additionally, some data structures were used in the project. These are Hash-lists and Array-lists. Hash-lists store city names as a key and inventory information as value. Array-lists contain name of the cities which categorized contain items. There are 3 type of item I used in project. These are A-B and C. These items stored following categorized data-structures. Hash-list(inventoryA,inventoryB,inventoryC) , Array-list(cityContainA,cityContainB,cityContainC).I also recorded the items we had to collect in a hash-list.

The following steps are applied in order to solve the problem.

1. Collecting items start from the first entry of shopping list (shopDict in Code)
2. The nearest city is selected where the selected material is.
3. Materials are collected and from second article the loop is repeated until the wish list is finished.

## 3 Advantages

1. Provide to find shortest path when shopDict item only contain 1 type.
2. Provide to find optimal path when shopDict items contain more than 1 type.
3. Low execution time. Max 1-3 seconds.
4. Low memory costs.

## 4 Disadvantages

1. Starting location is not checking for any items when code first executed but after the current node change items can collectible in starting location.
2. Items collection order is FIFO. Therefore, one item can not be passed to another until it is completely collected. So, if the city contain more than 1 item, Other items will not collect until shopDict item key's value reaches 0

## 5 Reading Outputs

The key words and explanations are below.

1. Small: The keyword represents city inventory is not enough to meet request so the items are taken up to the stock in the city.
2. Big: The keyword represents city inventory is enough to meet request.
3. 'B': 9, 'C': 10 : This demonstration shows how much material is left on the shopping list.
4. (146, ['Arad', 'Zerind', 'Oradea']) : The first number represents total distance from current city to target city. Second lists first item represents current city and the last item represents target city. All the items between current and target city are necessary cities to visit for reaching destination.