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C950 Performance Assessment

1. Algorithm Identification

The algorithm used to solve the performance assessment is the Nearest Neighbor.

B.1 Pseudocode

CREATE HASH TABLE IMPLEMENTATION

CREATE ADDRESS\_MODEL

CREATE DISTANCE MATRIX

CREATE TRUCK MODEL

CREATE PACKAGE MODEL

CREATE PACKAGE LOG HASH TABLE

FOR EACH CSV FILE: (addresses, distances, packages)

OPEN FILE

CREATE OBJECT

ADD OBJECT TO HASH TABLE

CREATE 3 TRUCKS

ASSIGN PACKAGES TO EACH TRUCKS

TAKE SNAPSHOT OF PACKAGES

INSERT SNAPSHOT INTO PACKAGE LOG

WHILE VARIABLE RUNNING IS TRUE

PRINT WELCOME

PRINT MENU

GET USER INPUT

IF USER INPUT == 1

RUN TRUCK DELIVERY

WHILE TRUCKS HAVE PACKAGES

SET TRUCKS TO DELIVERING

SET PACKAGES TO EN ROUTE

FIND NEAREST PACKAGE

FOR EACH PACKAGE IN PAYLOAD, CALCULATE DISTANCE TO PACKAGE

SET NEAREST PACKAGE TO PACKAGE WITH SHORTEST DISTANCE

SET TRUCK TO NEAREST PACKAGE

DELIVER PACKAGE AT NEAREST PACKAGE

REMOVE PACKAGE FROM TRUCK

PRINT ALL PACKAGE DELIVERY TIME

ELSE IF USER INPUT == 2

PRINT ALL PACKAGE DELIVERY TIME

USER INPUT PACKAGE DELIVERY TIME

USER INPUT PACAKGE ID

PRINT PACKAGE STATUS

ELSE IF USER INPUT == 3

PRINT ALL PACAKGE DELIVERY TIME

USER INPUT PACKAGE DELIVERY TIME

PRINT ALL PACKAGE STATUS

ELSE IF USER INPUT == 4

EXIT PROGRAM

PROMPT USER TO CONTINUE

GET USER INPUT

IF USER INPUT == Y

SET RUNNING TO TRUE

ELSE

SET RUNNING TO FALSE

B.2 Programming Environment

IDE: Visual Studio Code Version: 1.77.3 (Universal)

Python 3.9.6

B.3 Space-time complexity of major sections

Note: All major sections have been noted with space-time complexity in the code.

|  |  |  |
| --- | --- | --- |
| Section | Space-Complexity | Time-Complexity |
| Overall | O(n) | O(n^2) |
| Address DAO | O(n) | O(n) |
| Distance DAO | O(n) | O(n) |
| Package DAO | O(n) | O(n) |
| Hash map | O(n) | O(n) |
| Shortest distance  Nearest Neighbor Algorithm | O(n) | O(n) |
| Print package status | O(n) | O(n) |
| Find distance between two points | O(1) | O(n) |
| Main Truck Function | O(n) | O(n^2) |