
Program name : Project1_Design_Description_Schaefer_Kristin.pdf
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Main Function

Description: The main function is used to call the display menu options, collect user input to pass arguments to the menu function and to the Ant class member functions. It also deallocates dynamically allocated memory at the end of the function.

Process:

1. Make function call to display menu options
2. Call ant constructor to create ant object (representing the board)
3. Call function to start ant simulation
4. After simulation, make function call to menu options to ask user to play game again
5. Deallocate dynamically allocated memory

Menu Function

Description: The menu function is a reusable menu function which displays a start menu asking the user to enter "1" to start the simulation or to enter "2" to quit. After the simulation is complete, the menu function asks the user to enter "1" to play again or "2" to quit.

Key data members:

1. Variable to record user's menu choice

Key functions:

1. Main menu
 - 1. Start Lanton's Ant simulation
 - 2. Quit
2. Play again menu
 - 1. Play Langton's Ant simulation again
 - 2. Quit

Ant Class

Description: Ant is the class that is used to create a dynamic 2d array, representing the board of white spaces, black spaces and the ant. The class also runs the simulation Langton's Ant, stopping after the number of steps are completed.

Key data members:

1. Board
 - dynamic 2d array representing the board
2. Board row size
 - number of rows for the board
 - to be specified by the user
3. Board column size
 - number of columns for the board
 - to be specified by the user
4. Ant location
 - element of 2d array of chars representing current location of the ant
5. Starting row of the ant
 - variable containing the starting row of the ant
 - to be specified by the user
6. Starting column of the ant
 - variable containing the starting column of the ant
 - to be specified by the user
7. Number of steps
 - variable containing the total number of steps of the simulation
 - to be specified by the user
8. Ant orientation
 - variable containing the the current rotation of the ant

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Key functions:

1. Ant constructor
 - create dynamic 2d array of white spaces (represented by a space)
2. Ant location
 - set and update the value of the ant's location (represented by a "*" symbol) by modifying the array
3. Ant orientation
 - set and update the value of the ant's orientation
4. Ant simulation
 - start and run Langton's Ant simulation until the number of steps runs out
 - prints the current board