Data Structure Applications Quiz

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Part I – Identify a data structure that would be well-suited for each of the following data collections/application (be specific about data structure and the type of that data structure, e.g., doubly-linked list):

* the 64 squares on a chess board to be used for processing and evaluating moves

- 2d array

* a collection requiring quick adding, removing, and searching without any particular relationships or priorities among between the data elements

- sorted list

* a collection of operations for undoing and redoing (such as with a word processor)

- list (stack - LIFO)

* a concept map

- graph

* a Morse Code processor for the data received in dits and dashes and determining letters transmitted

- singly linked list

* a collection of web addresses to be used for back and forward navigation (as with the back and forward buttons in a web browser)

- doubly linked list

* a food web in nature

- graph

* a collection of orders to be processed in the order in which they are received

- heap

* a collection used to evaluate the best course of action through a sequence of moves such as in a chess game

- tree

* a collection for cities and roads to be used to determine the best route between a starting city and a destination city

- graph

Part II – After discussing each in your group, identify a specific and fitting collection/application for each of the following data structures (be specific about which type of that data structure as needed).

Array/vector - tensor of rank n (a mathematical object including scalars, vectors, and matrices) or n-dimensional array

Stack - computer memory holding operations and processing them

Queue - lunch line detailing each order coming in

Linked list (not stack or queue) - holding terminal commands from cmd or linux shell

Tree - holding a family tree

Hash table - student directory

Heap - priority queue can be used for emergency room patient priority

Graph - map of neural network

Part III – Give a fitting and specific example from the web, a book, or some other outside resource for each of the following:

Array/vector - <http://stackoverflow.com/questions/4810664/how-do-i-use-arrays-in-c>

- on this page they used an array to track a connect four game

Stack - <http://www.pcmag.com/encyclopedia/term/37932/application-stack>

- instant messangers use a stack for messages

Queue - <http://www.geeksforgeeks.org/applications-of-queue-data-structure/>

- Input/Output buffers

Linked list (not stack or queue) - <http://stackoverflow.com/questions/18801508/applications-of-linked-lists>

- used instead of arrays for stock market storage

Tree - company heirarchy structure

<http://www.referenceforbusiness.com/management/Ob-Or/Organizational-Chart.html>

Hash table - symbol table for compilers

<http://stackoverflow.com/questions/1539069/practical-uses-of-different-data-structures>

Heap - routing of network packets between two computers

<https://www.quora.com/What-real-world-problem-does-the-heap-data-structure-solve-in-computer-science>

Graph - Google

[https://www.google.com](https://www.google.com/)