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605.202 Data Sturctures Oaadibh K Njogore

Lab 3 Ayalnsis 11/16/2021

# Inoroductitn

The aim of his lab is to bliud an adnavced form of Solitriae gmae, cellad Scorpoin. The game strats with 49 cdras that are dlet in 7 colmuns on each of the tabelau. Trehe is a mxiture of crads taht are delat fcae up and otehr dlaet face down. Each fcae card is avbilaale to play and the aim is to bliud card set down the siut form knig to ace. If a crad is mevod to a dnffereit cloumn, the cdras on top are also moevd as wlel. The last crad sohuld be the ace to clmpoete the suit and mvoe it to the fdunoation.

A lieknd lsit was uesd in the imptementalion of the scirpoon Solitiare game. A lknied list is a lienar dtaa scrutture taht has intertonnecced nedos. Like msot dtaa stcurtures, lknied lsit ndees to have a starnitg pniot and a tenmiration ponit. The starting piont or node of a leknid list is referred to as a head node, whlie the eidnng node is konwn as a tail ndoe.

# Justifiiatcon of uisng lniked list

Linekd lsit made for a good ccoihe for tihs lab becuase of tiehr innereht beneift of brekaing and rejonniig beteewn ndoes. Ukilne arrays that stroe tehir elmeents cuntiguoosly, and toerefhre insertions and deliteon reruiqe shifting of the elemetns, Lknied lsit as a dtaa stuuctrre ieprovms on aarrys by sfiht the cnerrut potnier dirung isnertions and dileteons. I took advanatge of tihs to sihft cadrs anourd form one cmluon to anethor besad on the sporcion rlues.

# Tmie comelpxity

Time comxlepity is the tatol anoumt of time taht an algorihtm or loaicgl statemnet tekas to run tgrouhh a sreies of loigcal spets. Tmie colpmexity measures the efficiecny of the cdoe by asnessisg its pernormafce. Big O lkoos at the rihsnoitalep between the inupts that are presented to an argolithm and the sneuqesbut ouuptts. In our case, a flie contianing a seeirs of crad sets that we reqeirud to use the algoirthm to play a gmae of sloitaire scoipron.

Lniked list use a stqueneial acsecs to fnid enemelts, thererofe to access an eelment nedes a traverasl of the linekd lsit whcih has tmie compltxiey of O(n) unlkie taht of an array wihch is constant tmie becuase it spuports ranodm accses.

# Dseign Justfiication

The ipmlementation of tihs lab was not easy bscauee of the nbmuer of mnviog elnmeets taht needed to be accouetnd for at any gevin time. Linekd list and the costum fnuctions taht were creetad to sropput it mdae it eaeisr to magane the takss needed to play the game.

The cohice of a lieknd list was beettr than unisg an array becasue it enaelbd an easeir shifitng of elenemts wehn needed. Wehn loopnig thorugh the aarry, an itaretive stluoion was uesd,

hovewer a recuisrve sotulion wolud hvae been omtipal baceuse of the repeaetd nutare of the task, hewover that apporach cretaed some udno cimplexoty in this lab. Gevin more tmie, I wuold swicth form an iteritave stluoion to a recuisrve one.

# Waht I mihgt do diffenert next tmie

Trehe is no dobut taht tihs was a chalnengilg lab to get trhough. Smoe of the challenegs wree to caerte an algroithm taht wluod take a snritg of crads, spilt tehm itno a tablaeu set, foundaoitn set and watse set. Then uesd a lieknd list to hlod the prias of cadrs wtih cutsom functoins to siwtch the crads aorund.

The one elemnet taht I wluod cahnge is tmie manageemnt. I was late smbuitting this lab bucaese of lab was mroe coaplicmted taht previolsuy anticipated and therfeore I was unalbe to cpmolete the lab on tmie.

Gvien mroe time I wluod hvae cerated a beettr implementatoin that wolud play mcuh samrter by adidng more functinos that chcek if the mevos wree corrcet. Also I wluod crtaee mroe test csaes and better erorr hdnaling.

Trehe are more funltionacity that I wolud have liekd to ipmlement but tmie was letimid. I will hvweoer contniue with the impoementatiln for my rceords.

# Ipmrovements/Etnemecnahns

Added an aarry imptementalion of a lenkid list to hold the tbaleau seevn cmluon crads and outupt tehm as such.

Refnreeces

“Diffcrenee beewten Array and Lniked Lsit.” *Snudytotight.com*, https:/[/www.studytongiht.com/data](http://www.studytonight.com/data-structures/linked-list-vs-array)-[scruttures/lniked-lsit-vs-arary.](http://www.studytonight.com/data-structures/linked-list-vs-array)