Quiz2 for APT2060

Time 30 minutes

Question 1 (20 marks)

Analyze each of the following processes in terms of Big O notation

* Algorithms X and Y spend exactly TX(n) = 5·n7·log10n and TY(n) = 25·n microseconds, respectively, for a problem of size n. Which algorithm is better in the Big-Oh sense? Justify your answer 25n because with a larger input Tx increaseas exponentially while tyn increases linearly (2 marks)
* T=5 + 0.001n3+ 0.025n+25n6 (2 marks)

25n power 6 is the dorminant term so therefore its O(n^6)

* T=100n1.5+ 50nlog10 n+ 50n2log10 n+ 200n (2 marks)

**100n^1.5 is the dorminant term hence O(n^1.5)**

* 0.3n4+ 5n1.5+ 2.5·n1.75 (2 marks)

0.3n pow 4 is the dorminant term therefore O(n^4)

* T=n2log2n+n(log2n)9 (2 marks)

n^2log2n therefore O(n^2log n)

b) Write a linkedlist C++ program for manipulating data of type string using stack structure (10 marks)

#include <iostream>

using namespace std;

struct Node {

int data;

struct Node \*next;

};

struct Node\* top = NULL;

void push(int val) {

struct Node\* newnode = (struct Node\*) malloc(sizeof(struct Node));

newnode->data = val;

newnode->next = top;

top = newnode;

}

void pop() {

if(top==NULL)

cout<<"Stack is empty"<<endl;

else {

cout<<"The popped element is :"<< top->data <<endl;

top = top->next;

}

}

void display() {

struct Node\* ptr;

if(top == NULL)

cout<<"stack is empty";

else {

ptr = top;

cout<<"Stack elements are: ";

while (ptr != NULL) {

cout<< ptr->data <<" ";

ptr = ptr->next;

}

}

cout<<endl;

}

int main() {

int a, b;

cout<<"Add an element to stack"<<endl;

cout<<"Remove an item from stack"<<endl;

cout<<"Show stack elemenys"<<endl;

do {

cout<<"Enter choice: "<<endl;

cin>>a;

switch(a) {

case 1: {

cout<<"Enter value to be pushed:"<<endl;

cin>>b;

push(b);

break;

}

case 2: {

pop();

break;

}

case 3: {

display();

break;

}

}

}while(a!=3);

return 0;

}