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***Homework No. 1***

COMP 5113

Programming Languages

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Homework 1

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# Programming Problems and Solutions

* **Using C/C++, write a function to validate pairing of parentheses, brackets, and braces. To test the function, in main() function, input a string and pass it as the parameter to the function. Note that the string may have other characters. Spaces are used as delimiters. For instance, “[hello (world)]” and “{[hello world] ()}” are valid, but ”(]”, ”([)]” and “hello }{ word” are not.**
* **Solution Code:**

#include<iostream>

#include<stack>

#include<string>

using namespace std;

bool matchPair(char opening,char closing);

bool validateMatch(char str[]);

bool matchPair(char opening,char closing)

{

if(opening == '(' && closing == ')') return true;

else if(opening == '{' && closing == '}') return true;

else if(opening == '[' && closing == ']') return true;

return false;

}

bool validateMatch(char str[])

{

stack<char> s;

for(int i =0;i<char\_traits<char>::length(str);i++)

{

/\* look for openings and push them in stack\*/

if(str[i] == '(' || str[i] == '{' || str[i] == '[')

s.push(str[i]);

/\*look for the closings and pop openings from stack to match pair\*/

else if(str[i] == ')' || str[i] == '}' || str[i] == ']')

{

if(s.empty() || !matchPair(s.top(),str[i]))

return false;

else

s.pop();

}

}

/\*if the stack is empty by now, then its a valid string otherwise not\*/

return s.empty() ? true:false;

}

int main()

{

//cout << "Hello world!" << endl;

char s[100];

cout<<"please input the string: ";

cin.get(s,100);

cout<<"\nyour input string is: "<<s<<endl;

//validate(s);

if(validateMatch(s))

cout<<"The String is Valid!!! \n";

else

cout<<"The string is NOT VALID!!!\n";

return 0;

}

* **Using C/C++, define an integer array (size is greater than 20) and a target number (e.g. 120), assign the array with random numbers in (0, 100), then define a function to find all unique number pairs of the array such that each pair of the numbers adds up to the target number. Note that besides output the numbers of each pair, you are also required to print the original index information of the two numbers. For example, given array A = {5, 3, 4, 2, 6, 7}, target = 9, the number pairs are (5, 4), (3, 6), and (2, 7). Their index info is (0, 2), (1, 4), and (3, 5).**
* **SOLUTION CODE**

#include <iostream>

using namespace std;

void findpair(int a[], int limit, int target)

{

cout <<"in the function\n";

for(int i=0; i<limit; i++){

//cout<<a[i]<<" ";

for(int j=i+1; j<limit; j++ ){

if((a[i]+a[j])==target){

cout<<"Matched Pair \("<<a[i]<<", "<<a[j]<<"\)"<<" Index: \("<<i<<", "<<j<<"\)"<<endl;

}

}

}

}

int main()

{

// cout << "Hello world!" << endl;

int target;

cout<<"target number? : ";

cin >> target;

int a[50];

cout<<"";

cout<<"please input the numbers of array: \n";

int i=0;

cout << "Input positive numbers (between 0 to 100)or 'x' to stop: \n";

while ( true )

{

int input;

if ( !( cin >> input ) ) break;

if(input<0 || input>100){

cout<<"invalid input! please enter number between 0 to 100\n";

}

else

{

a[i]=input;

i++;

}

}

int total\_input=i;

//int arraysize = sizeof(a)/sizeof(int);

//cout<<"size of the array is: "<<arraysize<<endl;

/\*for(int j=0; j<total\_input ; j++)

{

cout<<a[j]<<endl;

}\*/

findpair(a, total\_input, target);

return 0;

}

# REVIEW QUESTION ANSWERS FROM BOOK

## Chapter-3 : Exercise – 6, 18, 19.

## Answers are attached as a hand written document with this.