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KAHLIL BELLO

DATA STRUTURES

SEPTEMBER 19, 2018

project 3 prob 4

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#include <iostream>

#include <ctime>

#include <string>

#include <cstring>

using namespace std;

//WHEN NOT USING A TEMPLATE STACK CLASS

class STACKint //type int

{

private:

int a[10];

int counter;

public:

void clearStack()

{

counter = 0;

}//end clearStack

bool emptyStack()

{

return (counter == 0) ? true : false;

}//end emptyStack

bool fullStack()

{

return (counter == 10) ? true : false;

}//end fullStack

void pushStack(int x)

{

a[counter] = x;

counter++;

}//end pushStack

int popStack()

{

counter--;

return a[counter];

}//end popStack

};//end class STACK int type

//########################################################################

class STACKchar //type char

{

private:

char a[10];

int counter;

public:

void clearStack()

{

counter = 0;

}//end clearStack

bool emptyStack()

{

return (counter == 0) ? true : false;

}//end emptyStack

bool fullStack()

{

return (counter == 10) ? true : false;

}//end fullStack

void pushStack(char x)

{

a[counter] = x;

counter++;

}//end pushStack

char popStack()

{

counter--;

return a[counter];

}//end popStack

};//end class STACK char type

//########################################################################

class STACKstr //type string

{

private:

string a[10];

int counter;

public:

void clearStack()

{

counter = 0;

}//end clearStack

bool emptyStack()

{

return (counter == 0) ? true : false;

}//end emptyStack

bool fullStack()

{

return (counter == 10) ? true : false;

}//end fullStack

void pushStack(string x)

{

a[counter] = x;

counter++;

}//end pushStack

string popStack()

{

counter--;

return a[counter];

}//end popStack

};//end class STACK string type

int main()

{

srand(time(0));

STACKint NUM;

STACKchar ALPHA;

STACKstr MONTHS;

NUM.clearStack();

ALPHA.clearStack();

MONTHS.clearStack();

int n;

cout << "Numbers: ";

for (int i = 1; i <= 10; ++i)

{

n = rand() % 29;

NUM.pushStack(n);

}

while (!NUM.emptyStack())

{

int x = NUM.popStack();

cout << x << " ";

}

cout << endl;

//#####################UPPERCASE##############################

cout << "Uppercase Letters: ";

int m;

for (int i = 1; i <= 10; ++i)

{

m = rand() % 25;

ALPHA.pushStack(char(65+(m)));

}

while (!ALPHA.emptyStack())

{

char y = ALPHA.popStack();

cout << y << " ";

}

cout << endl;

//######################MONTHS#############################

cout << "Months: ";

int o;

string months[12] = {"JAN", "FEB", "MAR", "APR", "MAY", "JUN", "JUL", "AUG", "SEP", "OCT", "NOV", "DEC"};

for (int i = 1; i <= 10; ++i)

{

o = rand() % 11;

MONTHS.pushStack(months[o]);

}

while (!MONTHS.emptyStack())

{

string z = MONTHS.popStack();

cout << z << " ";

}

cout << endl;

system("pause");

return 0;

}

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OUTPUT:

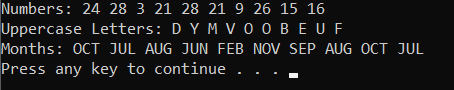
Numbers: 24 28 3 21 28 21 9 26 15 16

Uppercase Letters: D Y M V O O B E U F

Months: OCT JUL AUG JUN FEB NOV SEP AUG OCT JUL

Press any key to continue . . .

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USING A TEMPLATE FOR STACK

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project 3 prob 4

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#include <iostream>

#include <ctime>

#include <string>

#include <cstring>

using namespace std;

//WHEN USING A TEMPLATE FUNCTION FRO STACK CLASS

template<class T, int n>

class STACK

{

private:

T a[n];//T for typ, n for length

int counter;

public:

void clearStack()

{

counter = 0;

}//end clearStack

bool emptyStack()

{

return (counter == 0) ? true : false;

}//end emptyStack

bool fullStack()

{

return (counter == n) ? true : false;

}//end fullStack

void pushStack(T x)

{

a[counter] = x;

counter++;

}//end pushStack

T popStack()

{

counter--;

return a[counter];

}//end popStack

};//end class STACK

int main()

{

cout << "\n\n\n#########################################\n";

cout << "Using TEMPLATE class" << endl;

srand(time(0));

STACK <int, 10>NUM;

STACK <char, 10>ALPHA;

STACK <string, 10>MONTHS;

NUM.clearStack();

ALPHA.clearStack();

MONTHS.clearStack();

int n;

cout << "Numbers: ";

for (int i = 1; i <= 10; ++i)

{

n = rand() % 29;

NUM.pushStack(n);

}

while (!NUM.emptyStack())

{

int x = NUM.popStack();

cout << x << " ";

}

cout << endl;

//#####################UPPERCASE##############################

cout << "Uppercase Letters: ";

int m;

for (int i = 1; i <= 10; ++i)

{

m = rand() % 25;

ALPHA.pushStack(char(65 + (m)));

}

while (!ALPHA.emptyStack())

{

char y = ALPHA.popStack();

cout << y << " ";

}

cout << endl;

//######################MONTHS#############################

cout << "Months: ";

int o;

string months[12] = { "JAN", "FEB", "MAR", "APR", "MAY", "JUN", "JUL", "AUG", "SEP", "OCT", "NOV", "DEC" };

for (int i = 1; i <= 10; ++i)

{

o = rand() % 11;

MONTHS.pushStack(months[o]);

}

while (!MONTHS.emptyStack())

{

string z = MONTHS.popStack();

cout << z << " ";

}

cout << endl;

system("pause");

return 0;

}

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OUTPUT WITH TEMPLATE CLASS:

#########################################

Using TEMPLATE class

Numbers: 3 22 25 18 5 14 27 22 15 3

Uppercase Letters: H Q F G Q J D S N K

Months: JUN JAN OCT OCT FEB NOV FEB SEP FEB AUG

Press any key to continue . . .

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