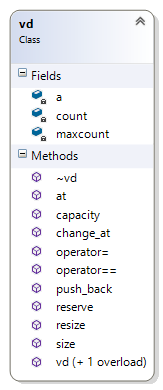
# Lab 8

Problem: Create a class that acts like a vector

UML Diagram:



## Source Files:

main.cpp:

#include "vd.h"

#include <time.h>

int main()

{

vd array;

int size;

int reserve;

int capacity;

int resize;

int position;

double value;

cout<<"How large would you like the vector to be? ";

cin>>size;

cout<<"\n\nFilling the vector randomly...";

srand(time(0));

for(int i=0;i<size;i++)

{

value=rand()%100;

array.push\_back(value);

}

cout<<array;

cout<<"\nCreating another random one!";

vd second;

for(int i=0;i<size;i++)

{

value=rand()%100;

second.push\_back(value);

}

cout<<second;

cout<<"\nChecking to see if it's equal!";

if(second==array)

cout<<"\nyep!";

else

cout<<"\nnope!";

cout<<endl<<endl<<"Here is the capacity of the vector: ";

capacity=array.capacity();

cout<<capacity<<endl;

cout<<endl<<"Here is the size of the vector: ";

size=array.size();

cout<<size<<endl;

cout<<endl<<"How much data would you like to reserve? ";

cin>>reserve;

array.reserve(reserve);

cout<<endl<<"Here is the capacity of the vector: ";

capacity=array.capacity();

cout<<capacity<<endl;

cout<<endl<<"Here is the size of the vector: ";

size=array.size();

cout<<size<<endl;

cout<<endl<<"What would you like to resize the vector to? ";

cin>>resize;

array.resize(resize);

cout<<endl<<"Here is the capacity of the vector: ";

capacity=array.capacity();

cout<<capacity<<endl;

cout<<endl<<"Here is the size of the vector: ";

size=array.size();

cout<<size<<endl;

cout<<endl<<"What individual cell would you like to examine? ";

cin>>position;

cout<<array.at(position);

cout<<endl<<"What cell value would you like to change? ";

cin>>position;

cout<<endl<<"What would you like to change the value to? ";

cin>>value;

array.change\_at(value,position);

cout<<endl<<"Now the value for the "<<position<<"th cell is: ";

cout<<array.at(position);

cout<<endl<<endl;

return 0;

}

vd.h:

#pragma once

#include <iostream>

#include <fstream>

using namespace std;

class vd

{

public:

vd(void);

~vd(void);

friend ostream& operator<<(ostream & out, const vd & v);

private:

int maxcount;

int count;

double\* a;

public:

void push\_back(double d);

int capacity(void);

int size(void);

void reserve(int i);

void resize(int i);

double at(int i);

void change\_at(double value,int i);

vd& operator=(const vd & rhs);

vd(const vd& rhs);

bool operator==(const vd & second)const;

};

vd.cpp:

#include "vd.h"

vd::vd(void)

: maxcount(5)

, count(0)

{

a= new double[maxcount];

}

vd::~vd(void)

{

delete [] a;

}

void vd::push\_back(double d)

{

if(count==maxcount)

{

maxcount=maxcount\*2;

double\* temp=new double[maxcount];

for(int i=0;i<count;i++)

temp[i]=a[i];

delete a;

a=temp;

}

a[count]=d;

count++;

}

ostream& operator<<(ostream & out,const vd & v)

{

for(int i=0;i<v.count;i++)

out<<v.a[i]<<endl;

return out;

}

int vd::capacity(void)

{

return maxcount;

}

int vd::size(void)

{

return count;

}

void vd::reserve(int i)

{

if(i>maxcount)

{

maxcount=i;

double\* temp=new double[maxcount];

for(int j=0;j<count;j++)

temp[j]=a[j];

delete a;

a=temp;

}

}

void vd::resize(int i)

{

if(maxcount<i)

{

maxcount=i;

count=i;

double\* temp=new double[i];

for(int j=0;j<i;j++)

temp[j]=a[j];

delete a;

a=temp;

}

else

{

maxcount=i;

double\* temp=new double[maxcount];

for(int j=0;j<count;j++)

temp[j]=a[j];

delete [] a;

a=temp;

}

}

double vd::at(int i)

{

if(i>maxcount)

{

cout<<"Error: This value doesn't exist yet!";

return -1;

}

else

return(a[i]);

}

void vd::change\_at(double value, int i)

{

if(i>maxcount)

cout<<"Error: This value doesn't exist yet!";

else

a[i]=value;

}

vd& vd::operator=(const vd & rhs)

{

delete [] a;

count=rhs.count;

maxcount=rhs.maxcount;

a=new double[maxcount];

for(int i=0;i<count;i++)

a[i]=rhs.a[i];

return \*this;

}

vd::vd(const vd& rhs)

{

//copy constructor

count=rhs.count;

maxcount=rhs.maxcount;

a=new double[maxcount];

for(int i=0;i<count;i++)

a[i]=rhs.a[i];

}

bool vd::operator==(const vd & second)const

{

for(int i=0;i<count;i++)

{

if(a[i]!=second.a[i])

return false;

}

return true;

}

## Sample Run:

How large would you like the vector to be? 7

Filling the vector randomly...78

36

37

46

24

20

66

Creating another random one!22

44

60

8

25

96

29

Checking to see if it's equal!

nope!

Here is the capacity of the vector: 10

Here is the size of the vector: 7

How much data would you like to reserve? 15

Here is the capacity of the vector: 15

Here is the size of the vector: 7

What would you like to resize the vector to? 10

Here is the capacity of the vector: 10

Here is the size of the vector: 7

What individual cell would you like to examine? 4

24

What cell value would you like to change? 3

What would you like to change the value to? 2

Now the value for the 3th cell is: 2

Press any key to continue . . .