Topic Discussion Final Submission

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Prof. Luyao Zhang

# Topic Discussion Final Submission

Byron Kooima 1 month ago

Hello everyone,

My name is Byron Kooima (koy-ma) and this is my second course at OSU. I tried to take this course in the spring (following CS161), but I ended up in Germany for a few weeks with the Air National Guard.

I went to Iowa State University for my undergrad in Electrical Engineering (which was 15 years ago) and finished my MBA 3 years ago. I work full time as a Systems Engineer for defense contractor (Raytheon).

I have been with the same company for 16 years and have had a lot of awesome experiences working the defense industry. I have realized recently that many of the contracts we win are 10:1 Software to Systems engineers. I have always enjoyed the software side of military equipment so it made sense to pursue a CS degree. It helps me fill a multi-discipline role and makes me significantly more versatile in finding other work.

Look forward to this semester, but have quickly realized that this is a heavily loaded class.

Jaycie David 1 month ago

Hi Byron! I also went to Iowa State University! I graduated 2 years ago with a BS in Psychology. (And yes, unfortunately I graduated with the hooligans who killed VEISHEA). Go Cyclones!!

Actions

Byron Kooima 1 month ago

Hi Jaycie,
Not sure you were necessarily the hooligans that killed VEISHEA. We did a lot in 2002 to try and sabotage it ourselves. In fact, it was cancelled for a couple of years while I was there b/c of some of the bad things that happened in previous years.

I lived in Tucson for 7 years after I graduated and really missed getting to follow the Cyclones. Ended up as a pseudo UofA Wildcat fan but it wasn't the same. Now that I have moved back to Omaha, I try to make it out to Ames at least once a year to catch a game or two.

Fun fact: We named our dog Cypress just so we can call out Cy any chance we get =).

Byron Kooima 3 days ago

I also opted to use pointers to various space types. There is a little more code in my main to create all of the rooms but it just makes more sense in my mind. So basically, if you lay out your 6 "Spaces" on paper, you can predetermine what rooms connect and where.
When a player enters another room, I already know what other rooms the current room points to. Then I just limit the menu options I provide to the user so they can only head to another "existing" room.

The bigger issue I am having with that is keeping the player from getting lost without some type of higher level map. I have been playing around with some ASCII art to come up with a nice overview, but that is for my end goal. Trying to stay focused on the task at hand and not try to over-engineer this thing.

Amir Rasekh 2 days ago

I was originally going to limit their movement, but then since there's a map the user is constantly looking at, I left it to the user to choose the correct direction each time--the map, though primitive, it does show openings to each space relative to where the user's current location. For a fully text-based game I can see how the user can get annoyed if they are given all directions as options without knowing which ones are really available.

Byron Kooima 1 day ago

I agree Amir with the map idea. I thought about making a small ascii map for each room and still provide all movement options. Then just telling the user when they try to move to NULL but my room menus were already starting to get overloaded.
I have multiple rooms that can be loaded with any number of my 6 creatures. Decided it would make sense to reuse my code from the Creature base class and start to play with room interactions that way. With the polymorphism in place, it is fairly easy to assign any number of Creatures to a single space.
I also decided to reuse the List-Item assignment for Batman's Utility Belt. Most of the functions I had in that assignment don't necessarily apply, but I just tailored it down. Cool thing is that I added a List to each Creature so when I fight the enemies, I just take the Item from their List and move it to my Utility Belt.

the students' answer,
where students collectively construct a single answer

I was going to implement this similar to the Creature strength in our previous Project.

1.One option is to decrement the Creature (player's) strength for each step they take. If they encounter an enemy, that could reduce their strength even more causing you to have less moves to make through the map.

2. You could also just create a separate variable for "moves" and find creative ways to decrement that throughout your program.

I have been drawing out my interactions and have not decided on the best choice yet.

The key is that there is something keeping track of how long you want the player to "play". I am going to start out with a very large number so that I can test all the iterations of my code, but eventually, I will try to find a challenging (but achievable) number of moves for the player.

~ An instructor (Andy Garcia) endorsed this answer ~

edit · thanks! 1

Updated 4 days ago by Byron Kooima

Since the pointer is a set size - the size of the base class - how is it that a derived class with more information capacity can fit into a pointer from the base class?

The memory operations (allocating and freeing) are handled by the operating system, they might be adjacent but not always.

Anonymous 23 days ago

Thank you

Byron Kooima 22 days ago

I don't know if Object Slicing is related to your discussion, but I thought I would ask a follow up question. So the issue I was having was trying to access the data members of the Derived object because of Object Slicing. Every time I would look at the vector Base object, I was having a hard time getting to the Derived object variables.
I don't know if there is a preferred method to do this, but I referenced some code from an MIT presentation on Type Casting and it helped a ton. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-088-introduction-to-c-memory-management-and-c-object-oriented-programming-january-iap-2010/lecture-notes/MIT6_088IAP10_lec05.pdf

I actually stepped through my vector and then used a dynamic_cast to determine if the object was a Student or Instructor (returns a boolean):
Student* sPeople = dynamic_cast<Student*>(ppl[personNum - 1]);
Instructor* iPeople = dynamic_cast<Instructor*>(ppl[personNum - 1]);

Byron Kooima 22 days ago

Sorry, my question was whether this was overkill on my part or if this is a valid option when you have a vector defined with Base Objects and you need to access the Derived Object?

Byron Kooima 22 days ago

So after spending hours on this, I just realized that if I have a true abstract function, I don't need to us the dynamic_cast. If I use
virtual void do_work(int) = 0;
in my People class, I can just use my ppl vector to access the pure virtual do_work() function.
ppl[personNum - 1]->do_work(45);

Can't believe I spent so much time trying to figure that out and it turned out to be a lot more simple than I made it out to be.

Byron Kooima 6 days ago

Project 3 was definitely the culmination of when to use abstract classes and virtual functions. I decided to make the attack function purely virtual and the defense function just a virtual function with a default

definition in the base class. It wasn't completely necessary to do it this way, but it really helped grasp the concept of when to use each type in your coding.
The main aspect of the polymorphism from this project was how to stop repeating the same code for each derived class. Once I finally grasped the concept of how to define a base class function and only override it when the derived class needed a slightly different outcome, everything in the project was simplified. I really like how polymorphism creates a hierarchy of objects and reduces (if not eliminates) the duplication of code.
I found it as essential to lay out my design plan on paper before implementing my virtual functions. Using the is-a and has-a relationship and drawing the lines between the classes really helps identify what functions/variables are needed or shared by derived classes. I have a really bad habit of just sitting down and hacking at a keyboard when I get a new assignment. This project really forced me to design all of the dependencies before writing the first class.

Byron Kooima 5 days ago

@Christopher. I have also found the single cpp file somewhat confusing at times when you need to separate the classes. However, I would say that the practice of splitting out the hpp and cpp is really helpful in understanding how the classes interact. I also started using the idea of combining my classes in one cpp to start and then breaking out the individual classes after I get the process down. I think it is just easier to see it in one place rather than clicking around to different cpp/hpp files. Especially when you start getting more than 10 files.

Byron Kooima 1 month ago

I had a lot of memory leaks with my program and Valgrind helped me quite a bit. Basically I had to refresh my memory on when my pointers were allocated and if I was deallocating that storage.

I found it was a lot easier to look at the scope of where my pointer was dynamically allocated and just de-allocate in the same function. I tried to use the destructor to clean up, but I had options to change the Langton Board size which made the destructor fail. It makes more sense to follow the logic path/flow and see where your pointer/array is in scope and destroy it in that same area.

Byron Kooima 5 days ago

I had hoped at some point in this course, I would get back to updating the makefile. However, like you said, it was a small price to pay to recompile all the object files every time. So, I have pretty much stayed with the TA's makefile with minor changes.

Byron Kooima 6 days ago

I don't mind Vim as a day to day tool for viewing code, but I have slowly transitioned to Visual Studio and Eclipse for my IDE.
I started out in CS161 only using Vim and since most of the SW developers I work with use Vim, it wasn't hard to get set up. However, after using VS at home about half way through 161, I haven't worked on any

assignments in Vim since. I do still use it on Flip when I need to make a minor change to my code or if Valgrind finds an issue.

It was really good to get familiar with creating code in Vim and forced me to think about connections between my class objects. I just found that generating code was so much faster (and easier in most cases) using a well developed IDE. So many of the mistakes I made early on in Vim did help me debugging the IDE so that was helpful. But once you have the background, I just feel the interactive aspect of the IDEs just makes life easier.

A lot of our developers also use Eclipse IDE for Java and C++ development. I started dabbling with that during CS162 and found it a little less intuitive than VS. There is more flexibility with plugins for Eclipse and all of it is readily available online, but the configuration to get my VS projects to work on Eclipse was fairly cumbersome. The largest advantage of Eclipse though, is its cross platform support. I was able to develop code on my Windows machine at home and open the workspace on Linux at work and everything works.

Anyone else find Eclipse to be your IDE of choice? I didn't see a lot of responses that indicated wide spread use.

Byron Kooima 5 days ago

I found this really great resource about the second week on stack overflow . I didn't fully understand the implementation at first (because it uses a template) but after a little bit of time it started making sense. The post by Max Bozzi allowed me to come up with a similar function but I made some modifications to work in almost any instance.

Once I figured out all the syntax, I incorporated my input verification into every project/lab we have had and really haven't made changes to it since week 2. I even got it to verify all of my strings, integers, doubles, and floats. The biggest challenge was figuring out how to fix it for the common integer verification where the user enters some int followed by letters (i.e. 3der3). Once I figured that out, I was using my verification function everywhere.

For my menu utility, I took a more stream lined approach. I wanted something flexible enough to handle most menus I could think of while still providing a reduction in duplicate code. I decided to go with three functions inside my userMenu class:

1. add_choice(string) - pushes the menu choice string into a vector
2. printMenu() - prints all the options loaded in the vector
3. int makeChoice() - utilizes my input verification along with the vector to make sure the user selects a valid choice.

None of the functions are overly complicated but it seems to work really well. I have been able to make nested menus by just creating an additional object.

Byron Kooima 4 days ago

Memory leaks were definitely the bane of my existence this semester. I never found a good way to check memory issues in VS on my Windows machine and based on posts from Amir, it appears the memory issues on Windows are different than Flip.

There were a lot of times where I also deleted my dynamic memory before I was done using it which is just about as painful. Once I started figuring out how to properly use Destructors, my issues with Valgrind seem to diminish significantly. I started looking at the smart pointer documentation and online videos, but don't think I will try to incorporate them into the final project. Just one more thing to try and comprehend with such a limited amount of time.

Byron Kooima 23 hours ago

My final project is a compilation of multiple previous projects and I tried to run it on Flip with Valgrind and I couldn't even scroll fast enough to read the 100's of lines of errors.
The good news is that after about 15 minutes, I was able to fix all my problems where it used to take me hours at the beginning of this course.
I would add another about the use of using the proper delete[] vs delete based on the object your are removing. That caught me a few times with arrays vs. normal class objects.
Additionally, I would add that tracing (or adding a basic std::cout) to your destructors can come in handy as well. It really has helped me in the past when I started using the virtual destructors in base classes.
Finally, I would say it is essential to know when/where you are not only new'ing up pointers but if you reassigned that pointer later in your code. I caught myself a number of times with destructors that were trying to delete memory allocation that was different size or in a different location b/c I reassigned the pointer.

Byron Kooima 23 hours ago

I would second the pointer test file. Another thing that really helped me was having a good IDE and monitoring the pointers there. Visual Studio's tracing is really good and I used debug a lot to see when pointers were getting set and what address they were set to. This was invaluable when I was struggling with the Doubly-linked circular lists in the previous lab. When I was trying to check for a NULL pointer in a list that had a head that linked back to itself was killing me. Finally, watching the output from the Debug interface in VS allowed me to see that I kept deleting a different pointer and the loop was endless.
As a separate plug, I use Eclipse at work (b/c it is free). I struggled with using Eclipse as an IDE b/c of setup at the beginning of the course, but have found its debug options exceptional. It has debug windows that really help tell a full story.

Byron Kooima 1 month ago

I also searched around for a way to handle the integer/string combination. The one I came across that seems to work well was here:
http://www.cplusplus.com/forum/beginner/55904/

I also found another one that appeared to work well at first but still has issues when you enter a valid integer followed by some number of characters:
https://stackoverflow.com/questions/23043210/how-to-have-a-good-validation-to-check-input-is-numeric

I really liked the approach from the stackoverflow site since it allows input validation of different data types, but was having a difficult time trying to combine approaches for the integer issue. If anyone has some additional thoughts, I think the class would benefit from a good combined input validation approach.

Anhdung Pham 1 month ago

I put everything in a Dropbox folder. (It has a version control feature where you can view old version if necessary).

I do the work on a laptop or home PC using Sublime Text. Then use filezilla + putty to compile on flip. I'm sure there's a better way but Dropbox works well for me.

Amir Rasekh 1 month ago

I do exactly that. Except I use Visual Studio as my IDE.

Byron Kooima 1 month ago

That has worked very well for me too. I use Visual Studio on my home computer and save the projects to my mapped Googe Drive.
It has saved me a few times since it allows me to access previous versions of the file.
Also, I can access Google Drive through the web on my work computer where everything else is restricted.