EEET2482/COSC2082 – Software Engineering Design, Advanced Programming Techniques

Week 5 - Exercises

1. Class with dynamic memory allocation

Write a C++ program which defines a class named Book with two attributes *name (string)* and *price* (integer). Provide constructor to initialize those attributes.

1. Create a Book object using dynamic memory allocation and initialize values for them through the constructor. *You should check for NULL pointer to detect whether the allocation is succeeded or not.*

Print out all information of the object, and free up memory space after that.

1. Ask the user to enter a number *n*. Create an array of *n* Book objects with random values using dynamic memory allocation. Print out the most expensive book. Free up memory space after that.
2. Modify the program so that name attribute is dynamically allocated in heap area (instead of stack). Write a destructor to free up memory allocated for it (when a Book object is destroyed).
3. Try-Catch statement. Write a program to
   1. Ask the user to enter two double values a and b for division. Throw an exception if b is 0, and ask the user to re-enter value for b.
   2. Write a loop that continuously request 1MB from the heap (as an array of char). Catch the exception to stop the loop if allocation fails and print out how much memory has been allocated.

*Check with physical size of RAM and Page file memories of your computer (using dxdiag command). Does it makes sense ?*

1. Union and range-based loop. Write a program which define a union named Students with two attributes firstName and fullName.
   1. Define an array of 3 students and initialize *fullName* for them.
   2. Use a range-based for loop to print out information of all students.
   3. Change the *firstName* of all three students to another name. Print out their *fullName*. What happens ?