CCNU-UOW
CSCI851 Advanced Programming
Autumn 2020

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Laboratory Exercise 9 (Week 9)

Note that lab exercises marked with a * are effectively extension exercises.

1 Task One: Warm–up exercises

1. Consider the file `Tracing.cpp`. Determine the order in which the constructors and destructors are called. Write down the sequence of line numbers associated with the constructors and destructors in the order they are used.

2. * What is the idea of the `mutable` data member? Write some code illustrating the idea.

3. How has the rounding of a negative quotient in division changed in C++11? Why does this matter?

4. The following tasks relate to inheritance. For each of the classes you should provide sufficient functionality to test your understanding of the relationships between the classes. You should, in particular, see how you can use constructors across classes.

   (a) Define a base class `Transportation`.

   (b) Define three derived classes, `SeaTransport`, `LandTransport`, and `AirTransport`.

   (c) Inheritance can occur across multiple levels. Define `Car` and `Canoe` as classes derived from appropriate classes.

   (d) It's possible to have multiple inheritance in C++. Define `HoverCraft` as derived from two appropriate classes.

2 Task Two: The Three Little Pigs

Carry out these tasks for `The Three Little Pigs`. Ideally you should be discussing this with other people.

1. Write a timeline identifying the events in the story.

2. Identify appropriate objects/classes and attributes/behaviours for those classes.

3. Sketch a class diagram showing the classes and appropriate relationships. This may be an somewhat iterative process with multiple versions.

4. Write code to implement the identified structures.

5. Write `main()` function(s) which when run will approximate the events of the story, or similar stories. It can be interactive if you like, to cover variations on the stories.