Test 2 Review

- **Enumerations**
  Basics: What is an enumeration? How is it defined and used? When do we use enumerations? How is an enumeration variable represented internally? Can we do arithmetic with enumeration constants?

- **Classes**
  Basics: What is a class and what is an object? How is a class defined? What are `private`, `protected` and `public` members?

  Special functions: What are the constructors, destructor, copy constructor? What are the Big Three and when are they needed?

  Overloaded operators: What is overloading?

  What are the main issues when overloading the stream insertion/extraction operators? The assignment operator? The post/pre-increment operator? Array subscript operator?

  When do we make an overloaded operator a member of a class? When shouldn't an overloaded operator be a member of a class?

  Friends of classes : What are `friend` functions? Why and how do we declare/define/use them? Can we have a friend class? Is friendship given or taken?

  `this`: What is the `this` pointer?

- **Inheritance**

  Basics: What is the main idea behind inheritance? What do we mean by the *is-a* relationship? What is public inheritance?

  Special functions: How are objects of derived classes constructed and destroyed? Can a derived class method use a base class method? Can a derived class override a base class method, and if so how?

  Relationships: What assignments are allowed between derived and base class objects? Why should we be careful with diamond inheritance? How does virtual inheritance help?

  Virtual methods: When should a method be virtual? How does it work? What is `dynamic_cast` and how is it used in this context? What is a pure virtual method? When is a class abstract and why would it need to be so?

- **Templates**

  Basics: What is the main idea behind templates? How do you define and how do you use a function template? How do you define and how do you use a class template? Why must the implementation code of a class template be in the same file as the declaration code?