Using Special Member Functions in C++11 Solutions

Rule of Zero

- Explain what is meant by the "Rule of Zero"
  - The Rule of Zero means that the programmer should not define any special member functions
  - Instead, the class will use the compiler-generated special member functions
- When should the Rule of Zero be used?
  - The Rule of Zero should be used when the compiler-generated functions give the correct behaviour
  - This is the case if the class does not need a custom destructor
  - This applies to the large majority of classes

Rule of Five

- Explain what is meant by the "Rule of Five"
  - The Rule of Zero means that the programmer should define custom versions of the
    - Destructor
    - Copy operators
    - Move operators

- When should the Rule of Five be used?
  - The Rule of Zero should be used when the compiler-generated functions do not give the correct behaviour
  - This is the case if the class does not need a custom destructor
  - Typically used when the class manages a resource

Move-only Class

- Explain how to make a move-only class
  - To make a class move-only, define custom versions of the
  - Destructor
  - Move constructor
  - Move assignment operator
- Give an example of when a move-only class could be useful
  - A class which manages a resource which cannot (or should not) be copied
  - e.g. file handle, network connection, database connection

Immoveable Class

- Explain how to make an immoveable class
  - To make an immoveable class, delete the copy operators

- Give an example of when an immoveable class could be useful
  - Immoveable objects cannot be passed to functions or returned from functions
  - e.g. certain low-level concurrency objects which should only exist in the scope in which they are created

Copy-only Class

- Explain how to make a copy-only class
  - To make a class copy-only, declare the move operators as deleted

- Why are copy-only classes not recommended?
  - Although the move operators are deleted, the compiler can still decide they are the best match for a call
  - If a moveable rvalue argument is passed, the deleted move function is selected
  - The call will then cause a compiler error