Constexpr Functions Solutions

constexpr functions

- What is a constexpr function?
  - A constexpr function takes arguments which are constant expressions and return a constant expression
  - The computations are performed at compile time
  - Constexpr functions are implemented using a compile-time interpreter which supports most of C++

constexpr function

- What are the requirements for a constexpr function?
  - A constexpr function must be "pure"
  - It cannot modify its arguments, and cannot modify global or static variables
  - The body of a constexpr function must not contain any code that could cause an action at runtime
- How do we make a function constexpr?
  - To make a function constexpr, we put the constexpr keyword before its return type

Run-time constexpr functions

- What happens if a constexpr function is called with arguments that are not constant expressions?
  - The function's return value is not a constant expression
  - The function is evaluated at runtime
  - However, if a constant return value is required, there is a compiler error
- Why is this useful?
  - It avoids the need to write a another version of the function for variables
  - This would be identical except for the "constexpr" keyword

constexpr member functions

- What does it mean for a member function to be
  - const
  - The member function can access data members of the object through the "this" pointer, but cannot modify them
  - constexpr
  - The member function returns an constant expression