Variant Type Solutions

std::variant

- Briefly describe std::variant
  - std::variant is a class
  - It can store data of different types, but only one type is in use at a time

Default Constructor

- Write down the declaration of a variant which can store a char, an int or a double
  - variant<char, int, double> v;
- How will this variant be initialized?
  - The variant will be initialized with its first member in use
  - This member will be value-initialized
  - In this case, it will store a char with value 0

Converting Constructor

- Write down the declaration of a variant which
  - Can store an std::string or an int
  - Will be initialized with the int member in use
  - std::variant<std::string, int> vscci{42};

Assigning Data to a Variant

- Write a program which uses your variant declaration from the first exercise
- Store a double in the variant
- Check that your program compiles
- What happens if you try to store data that does not match any of the alternatives?
  - The compiler gives an error

Accessing Data in a Variant

- Modify your program to display the double you stored in the last exercise
- Use two different ways to access the data
- What happens if you try to access an alternative that is not in use?
  - An exception of type std::bad_variant_access is thrown

std::get_if()

- What is the difference between std::get() and std::get_if()?
  - std::get() takes the variant as argument
  - It returns the data in the requested alternative, if it is in use
  - If not, it throws std::bad_variant_access
  - std::get_if() takes a pointer to the variant
  - It returns a pointer to the data in the requested alternative, if it is in use
  - If not, it returns a null pointer
- Rewrite your program from the last exercise to use get_if()

std::holds_alternative()

- Briefly describe std::holds_alternative()
  - std::holds_alternative() returns true if a given alternative is in use
  - Otherwise, false
- Write a program which uses holds_alternative()

index() Member Function

- Briefly describe the index() member function of std::variant
  - The index() member function returns the index of the alternative in use