

fn then_index_or_default

Michael Shoemate

This proof resides in “**contrib**” because it has not completed the vetting process.

Proves soundness of the implementation of `then_index_or_default` in `mod.rs` at commit f5bb719 (outdated¹).

This postprocessor indexes into a vector or returns the default value of the type if the index does not exist.

1 Hoare Triple

Precondition

Compiler-Verified

- Generic T implements trait Default

User-Verified

None

Pseudocode

```
1 def then_index_or_default(
2     index: usize,
3 ) -> Function[Vec[T], T]:
4     return Function.new(lambda x: x[index] if index < len(x) else T.default())
```

Postcondition

Theorem 1.1. For every setting of the input parameters (`index`, `T`) to `then_index_or_default` such that the given preconditions hold, `then_index_or_default` raises an error (at compile time or run time) or returns a valid postprocessor. A valid postprocessor has the following property:

1. (Data-independent errors). For every pair of members x and x' in `input_domain`, $\text{function}(x), \text{function}(x')$ either both raise the same error, or neither raise an error.

Proof. The function is infallible, so the function satisfies the data-independent errors property. Therefore the postcondition is satisfied. \square

¹See new changes with `git diff f5bb719..dfccb8d rust/src/transformations/scalar_to_vector/mod.rs`