4-2: Iterators, stdlib collections, IO (Practice)

Artem Pavlov, TII, Abu Dhabi, 06.05.2024

Create new crate

- Create new branch in the repository p42
- Create new library crate p42
- Check that p42 is listed as a member of the workspace in the root Cargo.toml

“The Twelve Days of Christmas” iterator

- Create song module
- Implement SongIter type which implements the Iterator trait
- Iterator should return String lines of the “The Twelve Days of Christmas” song (with the line break)
- Create function which returns song iterator with numbered lines (based on SongIter), e.g. “01: ”, “02: “, etc.
- Create generic iterator wrapper which duplicates value N times (e.g. with N = 2 and SongIter each song long will be duplicated)

Using iterator

- Add to the song module the following generic functions which accept Iterator of Strings:
  - song_to_string: concatenates the iterator items into one String and returns it
  - song_to_file: accepts iterator and path, creates file with the path, and writes the iterator strings into it
  - song_to_tcp: accepts iterator and address, opens TCP connection to the provided adress and writes the iterator strings into it
  - song_from_tcp: listens for incoming connections on the given port (and 0.0.0.0 IP address), locks stdout, and prints into it lines received from the first incoming TCP connection
- Correctly handle potential errors

Refactoring the bank model

- Copy the bank model implemented in 3-2 into bank module
- Refactor it to use HashMap instead of Vec
- Handle potential overflows and underflows
- Use TryInto/TryFrom for converting between i64 and u64