

# 2-2: Control Flow and Pattern Matching (Practice)

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Artem Pavlov, TII, Abu Dhabi, 15.04.2025

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# Create new crate

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- Create new branch in the repository **p22**
- Create new library crate **p22** (e.g. by using **cargo new --lib p22**)
- Check that **p22** is listed as a member of the workspace in the root **Cargo.toml**

# Calculator

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- Create `calc` module
- Write 3 functions in it:
  - `celsius2fahrenheit(celsius: i32) -> i32`
  - `fahrenheit2celsius(fahrenheit: i32) -> i32`
  - `fibonacci_loop(n: u32) -> u64` (with loop, without using recursion)
  - `fibonacci_rec(n: u32) -> u64` (with `match` and recursion)
- Write doctests and integration tests for them
- Write benchmarks for the Fibonacci functions

# Song

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- Create **song** module
- Create a function which prints the lyrics to the Christmas carol “The Twelve Days of Christmas,” taking advantage of the repetition in the song.
- Create a binary (i.e. file in **src/bin/**) which executes this function

# Figures

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- Create **figures** module
- Define the following types:
  - Point: contains **x** and **y** fields
  - Circle: contains center point and radius
  - Triangle: contains 3 points
  - Rectangle: contains 2 points
  - Shape: enumeration of point, circle, triangle, and rectangle
- Derive appropriate traits for the types
- Define free-standing functions (not methods) which compute area and perimeter for each type (i.e. you need 10 functions in total)
- Add doc tests for each function, unit tests for area functions, and integration tests for perimeter functions

# Tic-tac-toe

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- Create `tictac` module
- Define `TicTacField` struct using arrays and enums
- Write `analyze` function which analyzes the field and can return 4 results: `WinX`, `WinY`, `WinBoth`, `GameOn`
- Write functions which modifies the field with the following signature:  
`fn make_move(field: TicTacField, x: u32, y: u32, player: Player) -> Result<TicTacField, Error>`
- The `Error` type should handle possible error cases
- Write tests for both functions