🎯 Target Function

- Function to optimize
- Should return values for each objective (minimization → the smaller the better)
- Receives configuration, seed, budget, and/or instance

📋 Scenario

Setup optimization (non-exhaustive):
- configuration space
- objectives
- budget/number of trials
- time limits
- number of workers
- instances
- output directories

🏛 Facade

- Provides default options for specific use-cases
- Managing/assemble/validate/initialize components (like configuration selector, runhistory, etc.)
- Creating dependencies across components

Entry Point for SMAC

Presets
General Black-Box Optimization
Algorithm Configuration
Multi-Fidelity
Multi-Objective

optimize()

SMAC

🖥 Sequential Model-Based Optimization (SMBO)

- Execute Bayesian Optimization loop
- Ask-and-tell interface
- Keep track of status (e.g., how many trials/wallclock time left) and when to stop
- Load/save runs

use runner to evaluate trials

➡on tell end: update incumbent(s) based on trial's configuration

➡in ask method: get next trial

🏃 Runner

- Supports multi-processing: Each worker can evaluate one trial via Dask
- Waits if no worker is available

in tell method: add trial

📔 Runhistory

- Holds evaluated/running/failing trials
- Calculates the (normalized) cost for configurations

check existing trials/configurations if they are worth intensifying

get existing configs via the RunHistoryEncoder

🧩 Configuration Selector

- Makes use of initial design, surrogate model, acquisition function/maximizer
- Returns (new/unseen) configurations in generator style
- Incorporates also runhistory to check which configurations already have been used

🐾 Intensifier

- Responsible for providing next trials: Either intensify a configuration or start a new configuration
- Next trials are depending on intensifier (e.g., Successive Halving needs a different implementation than a normal intensifier)
- Keeps track of the incumbent(s)

call when new configuration is needed