Rust Code Test Coverage Profile

- this project give a short overview rust code coverage and profile

My project platform

```
cat /etc/os-release
PRETTY_NAME="Ubuntu 22.04.4 LTS"
NAME="Ubuntu"
VERSION_ID="22.04"
VERSION="22.04.4 LTS (Jammy Jellyfish)"
VERSION_CODENAME=jammy
ID=ubuntu
ID_LIKE=debian
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-
policies/privacy-policy"
UBUNTU_CODENAME=jammy
```

My rust version at creation this project

```
rustup show
Default host: x86_64-unknown-linux-gnu
rustup home:  /home/trapapa/.rustup

installed toolchains
--------------------

stable-x86_64-unknown-linux-gnu
nightly-x86_64-unknown-linux-gnu (default)

active toolchain
----------------

stable-x86_64-unknown-linux-gnu (directory override for
'/home/trapapa/rust_code_test_coverage_profile')
rustc 1.78.0 (9b00956e5 2024-04-29)
```

I'm use microsoft vscode version

```
code --version
1.89.1
```

```
dc96b837cf6bb4af9cd736aa3af08cf8279f7685
x64
```

I'm used this vscode extension special for this project

```
code --list-extensions |grep coverage
ryanluker.vscode-coverage-gutters
```

Project setup

> [!NOTE] > Project Setup From Here

> [!TIP] > How to set json with comment in MS Video Studio Code

> [!NOTE] > Update rust to latest stable version

Instal crates to be used in this project

- I'm use cargo edit, show my tutorial for install additional package

```
# update all project crates
cargo update
# install cargo-tarpaulin
cargo add cargo-tarpaulin
# /w features
cargo add --features vendored-openssl cargo-tarpaulin
# install flamegraph
cargo add flamegraph
# show version of dependencies and current version vs. akt. version
cargo update --verbose
```

first testcase

```
#!/usr/bin/env bash
export EXAMPLE_SCRIPT_FILE="01_first_testcase.rs"
export EXAMPLE_SCRIPT_DIR="examples/"
cat << EoF > ./$EXAMPLE_SCRIPT_DIR/$EXAMPLE_SCRIPT_FILE
// FROM HERE
//
https://github.com/MathiasStadler/repo_template/blob/main/includes/dummy_sm
all_rust_codeblock.md
pub fn main(){
```

```
    println!("Hello, world!");
}

#[cfg(test)]
mod test {

    use super::*;

    #[test]
    fn test_main() {
        assert_eq!(main(), ());
    }
}


/*
export FILE_NAME=$EXAMPLE_SCRIPT_FILE
export FILE_DIR_NAME=$EXAMPLE_SCRIPT_DIR
echo "build prg => \$(echo \$FILE_NAME | cut -d . -f 1)";
cargo build --example "\$(echo \$FILE_NAME | cut -d . -f 1)"
echo "run PRG => \$(echo \$FILE_NAME | cut -d . -f 1)";
cargo run --example "\$(echo \$FILE_NAME | cut -d . -f 1)"
echo "";
echo "run TEST => \$(echo \$FILE_NAME | cut -d . -f 1)"
cargo test --example "\$(echo \$FILE_NAME | cut -d . -f 1)"
# cargo test --jobs 4 --example "\$(echo \$FILE_NAME | cut -d . -f 1)"
echo "ReturnCode => \$?"
*/
EoF
```

- Speed up Rust CI pipelines that use Tarpaulin

use simple test coverage

> [!TIP] a toolchain/build target its own target directory `--target-dir` avoid project new compiling for each new test run after small change inside test

```
--target-dir target/tarpaulin-target/
```

I'm ignore all testcase

- add

```
--ignore-tests
```

run all test inside the examples folder

- add command line

```
--example
```

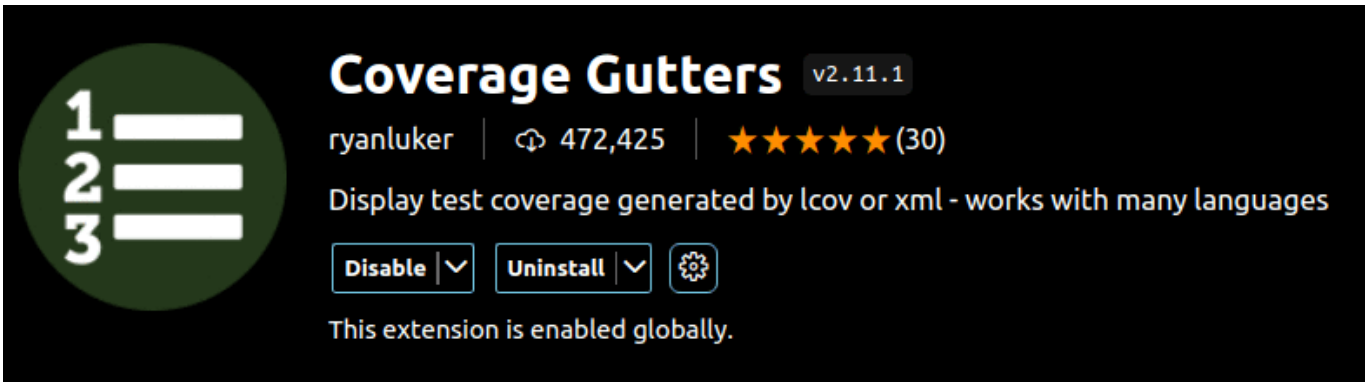
- command

```
cargo tarpaulin --ignore-tests --target-dir target/tarpaulin-target/ --
skip-clean --out Lcov --example
```

- output

```
100.00% coverage, 2/2 lines covered, +0.00% change in coverage
```

I'm use to show coverage inside code via vscode plugin - Coverage Gutters v2.11.1



second testcase

profile code /w plugin flamegraph

install crates flamegraph

> [!NOTE] HERE CONTINUE

install linux-perf

check already installed

```
apt list --installed linux-tools-`uname -r`
apt list --installed linux-tools-common
apt list --installed linux-tools-generic
```

if NOT installed

```
sudo apt update
sudo apt install linux-tools-common linux-tools-generic linux-tools-`uname
-r`
```

Enabling perf for use by unprivileged users

> [!NOTE] To enable perf without running as root, you may lower the perf_event_paranoid value in proc to an appropriate level for your environment. The most permissive value is -1 but may not be acceptable for your security needs etc.

```
cat /proc/sys/kernel/perf_event_paranoid
sudo echo -1 | sudo tee /proc/sys/kernel/perf_event_paranoid
```

run flamegraph

- by default, `--release` profile is used,

```
# --target-dir target/flamegraph-target/
cargo flamegraph
```

- but you can override this:

```
cargo flamegraph --dev
```

> [!NOTE] Samples in kernel modules won't be resolved at all. If some relocation was applied (e.g. kexec) symbols may be misresolved even with a suitable vmlinux or kallsyms file. Couldn't record kernel reference relocation symbol Symbol resolution may be skewed if relocation was used (e.g. kexec). Check /proc/kallsyms permission or run as root. CHANGE IT to use is for normal user NOT root
>
> ```
> # show value
> echo 0 | sudo tee /proc/sys/kernel/kptr_restrict
> # set value to 0
> echo 0 | sudo tee /proc/sys/kernel/kptr_restrict
> ```

perf

> [!TIP] Tutorial about perf install/using [!NOTE] Cannot load tips.txt file, please install perf! How to get perf fully working with all features?

```

```

```
mkdir -p /usr/share/doc/perf-tip && \
wget
https://raw.githubusercontent.com/torvalds/linux/master/tools/perf/Document
ation/tips.txt -O /usr/share/doc/perf-tip/tips.txt
```

garbage

FROM HERE

FORM HERE

convert ./test_pictures.png -resize 33% ./out.png base64 ./out.png