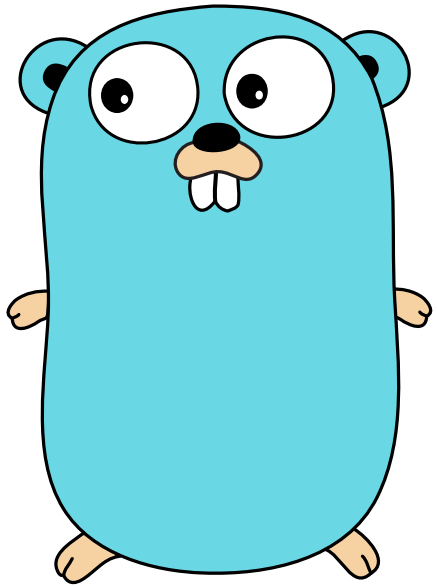
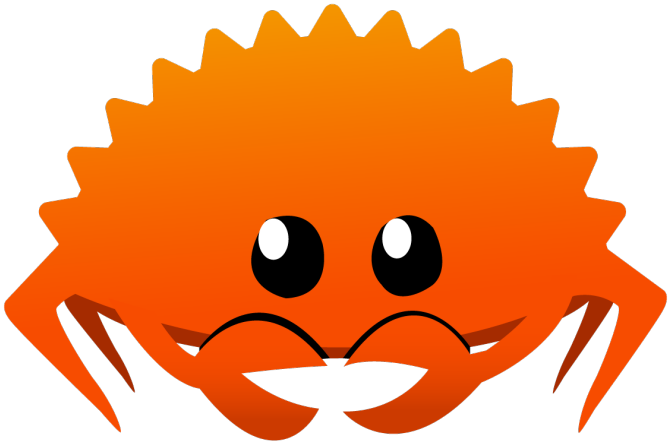
Parallel Programming – Go vs Rust





Overview of Rust

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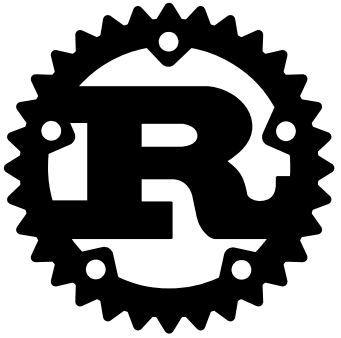
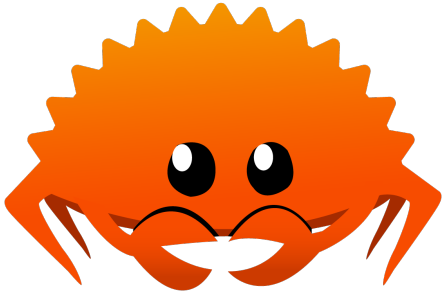
- Since 2015
- Compiled
- Static typed
- High performance

- Design goals:
  - Safety
  - Control over memory
  - Highly concurrent





Concepts in common

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- Channels
- Mutexes
- Read write locks
- Atomic types
- Condition variables
- Once

Things **not** in common

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Go

- WaitGroups
- select
- Pools of temporary objects
- Thread-safe map

Rust

- Join
- Barrier
- Arc

  atomically reference counting pointers

Comparison of syntax

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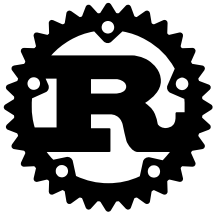

```go
package main

import "fmt"

func sum(numbers []int, channel chan int) {
    sum := 0
    for _, value := range numbers {
        sum += value
    }
    channel <- sum
}

func main() {
    numbers := []int{7, 2, 8, -9, 4, 0}
    channel := make(chan int)

    go sum(numbers[:len(numbers)/2], channel)
    go sum(numbers[len(numbers)/2:], channel)

    x := <-channel
    y := <-channel

    fmt.Println(x, y, x+y)
}

```

```rust
use std::sync::mpsc;
use std::thread;

fn sum(numbers: &[i32], tx: &mpsc::Sender<i32>) {
    let mut sum = 0;
    for value in numbers {
        sum += value;
    }
    tx.send(sum).unwrap();
}

fn main() {
    let numbers = [7, 2, 8, -9, 4, 0];
    let (tx, rx): (mpsc::Sender<i32>, mpsc::Receiver<i32>) = mpsc::channel();
    let tx1 = mpsc::Sender::clone(&tx);

    thread::spawn(move || sum(&numbers[..numbers.len() / 2], &tx1));
    thread::spawn(move || sum(&numbers[numbers.len() / 2..], &tx));

    let x = rx.recv().unwrap();
    let y = rx.recv().unwrap();

    println!("{} {} {}", x, y, x + y);
}

```

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}
```

```rust
{

iver<i32>) = mpsc::channel();

.len() / 2], &tx1));
en() / 2..], &tx));
```

Threading model

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Goroutines

Several program threads
get multiplexed
on several system threads

by the goruntime

Rust Threads

One program thread
is
one system thread

Conclusion

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- Most of the concepts are realised in both languages
- Biggest difference is the threading model
- Go is more easy to read and write
- Rust enforces safety

- M
  la
- Bi
- G
- R


NOT SURE IF I SHOULD GO WITH SIMPLE CODE
OR EXTRA SECURITY
memegenerator.net

Sources

- https://www.rust-lang.org/logos/rust-logo-blk.svg
- http://rustacean.net/assets/rustacean-orig-noshadow.svg
- https://golang.org/s/logos
- https://github.com/golang-samples/gopher-vector/raw/master/gopher.svg
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- https://memegenerator.net/img/instances/82573761/one-does-not-simply-ignore-the-ownership-system.jpg