High Performance Rust

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epcc

Can we write High Performance Code in Rust?

- What do we mean by this?
- What is Rust?
- Why should we care?

Memory Safety in C

input:

```
#include <stdio.h>

void main(){
    int *a, *b;
    int var = 2;
    a = &var;
    printf("*a = %d\n", *a);
    b = a;
    printf("*b = %d\n", *b);
    *b = *b + 6;
    printf("*b = %d *a = %d\n", *b, *a);
}
```

output:

Memory Safety in C

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    int *a, *b;
    int var = 2;
    a = &var;
    printf("*a = %d\n", *a);
    b = a;
    printf("*b = %d\n", *b);
    *b = *b + 6;
    printf("*b = %d, *a = %d\n", *b, *a);
}
```

output:

```
*a = 2
*b = 2
*b = 8, *a = 8
```

Memory Safety in Rust

input:

```
fn main() {

    let a = Box::new(5i32);
    println!("*a is {}", *a);
    let mut b = a;
    println!("*b is {}", *b);
    *b = *b + 2;
    println!("*b is {}, a is {}", *b, *a);

}
```

output:

Memory Safety in Rust

```
error[E0382]: borrow of moved value: `a`
 --> src/main.rs:9:40
  |
6 |     let mut b = a;
  |                 - value moved here
…
9 |     println!("*b is {}, *a is {}", *b, *a);
  |                                        ^^ value borrowed here after move

error: aborting due to previous error

For more information about this error, try `rustc --explain E0382`.
```

Project Plan

- Port a HPC mini app to Rust
- Document development experience
- Compare performance of Rust and the mini app

Difficulties

- Competing with optimised code
- Rust is a moving platform

Questions