Arithmetic/Logic instructions

“easy”: two operands or one operand and a constant (immediate)

like `sll`, `add`, `xor`, `slt`, etc.

because immediate are limited in terms of space, we can use a register with `lui` (12 bits), then `addiu` (add unsigned) and `xor` to copy

Assembler directives

Like `.text`, `.data`, `.asciiz`..

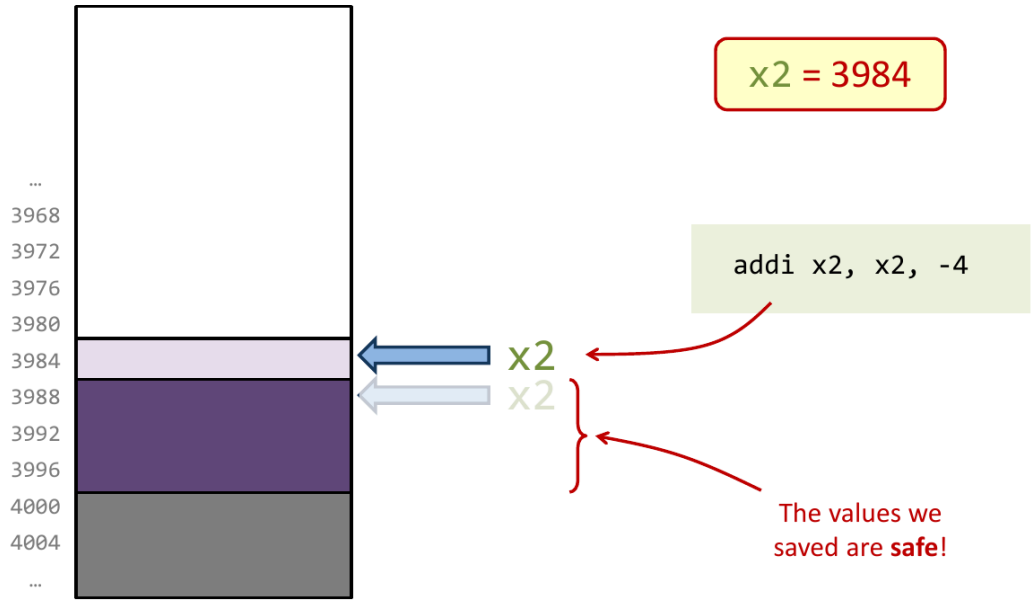
Functions

`jal x1, sqrt` –> leaves `PC+4` into the `x1` register so the funtion can callback `x1` with a simple `jr x1` when finishing.

With RISCV we can simply use `jal offset` and `ret` instead of specifying the register `x1`.

Stack Pointer

Dynamically Allocating More Space



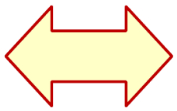
Stack Pointer

- This is so important that we are going to devote a register to this purpose and **everybody** will comply with our **conventions**

Register	ABI Name	Description	Preserved across call?
x2	sp	Stack pointer	Yes

- Other architectures have special instructions to place stuff on the stack (**push**) and to retrieve it (**pop**)

```
PUSH AX
```



```
add   sp, sp, -4
sw    x5, 0(sp)
```

Passing Arguments

Passing Arguments: The RISC-V Way

- A bit of both
  - **Some registers reserved** for the arguments and return value(s)

Register	ABI Name	Description	Preserved across call?
x10–11	a0–1	Function arguments/return values	No
x12–17	a2–7	Function arguments	No

  - Rest goes on the **stack**