

## Most ISAs Have Special Instructions for Subroutines

The **READNUM** code in the example is called a **subroutine**.

The notion of subroutines

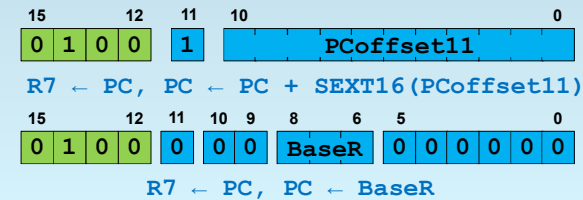
- also called **procedures**, **functions**, **methods**, and so on
- is so important that
- **most ISAs have special instructions to support subroutines.**

LC-3 also has such instructions.

## JSR and JSRR Call Subroutines in LC-3

LC-3 offers two ways to **call a subroutine**: **JSR** (top form), and **JSRR** (bottom form).

Notice that either can replace our two-instruction sequence, and both change R7.



## Call Subroutines with JSR(R), Return with RET

Using JSR, we now have...

; read degree N from keyboard

**JSR READNUM**

; loop from 0 to N

; read coefficient from keyboard

**JSR READNUM**

; continue with next loop iteration

**Return from subroutine** is still **JMP R7**,

But the **assembler allows pseudo-op RET**.

```

READNUM
; ... code to read
; a number from
; keyboard
JMP R7 RET
```