

# Exercises in System Level Programming (SLP) – Summer Term 2026

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## Exercise 4

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Lehrstuhl für Informatik 4  
Systemsoftware



Friedrich-Alexander-Universität  
Faculty of Engineering

## **Presentation Assignment 2**

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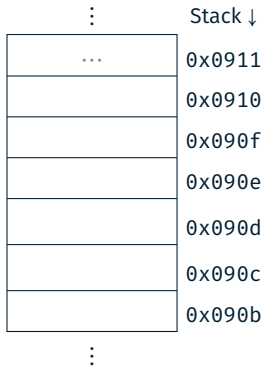
# Pointers & Arrays

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- Variable: `uint8_t x`
- Pointer: `uint8_t *y`
- Address-of operator: `&x`
- Indirection operator: `*y`

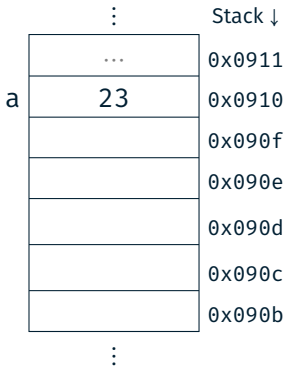
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02 uint8_t b = 42;
03 uint8_t * p = &a;
04 *p = 66;
05 p = &b;
06 *p -= 40;
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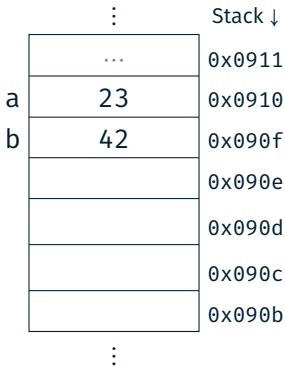


**Caution:** The exact placement of the variable on the stack depends on the compiler and the chosen optimization level!



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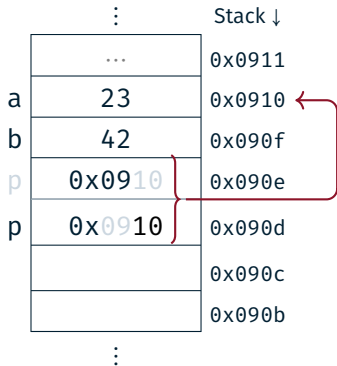


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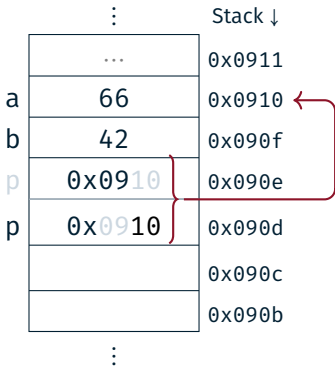


**Caution:** ATmega328PB has 8-bit registers and 16-bit addresses



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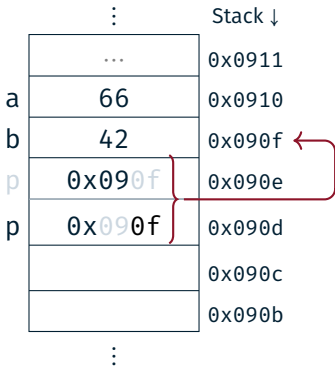


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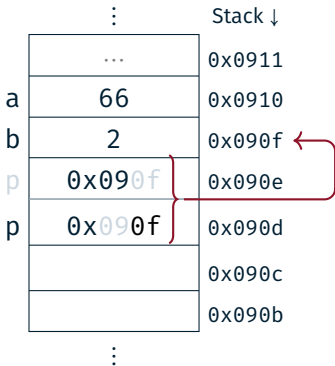


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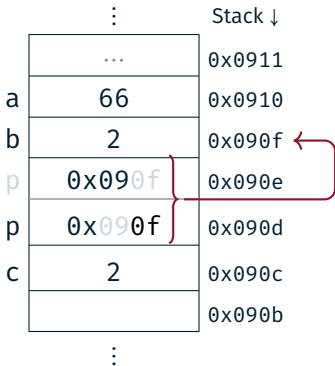


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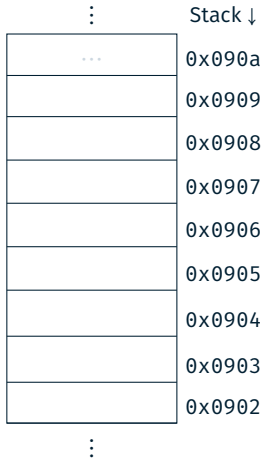


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- Variable pointer: `uint8_t *b`
- Current element: `*b`
- x-th element: `b[x]`
- x-th element: `*(b+x)`

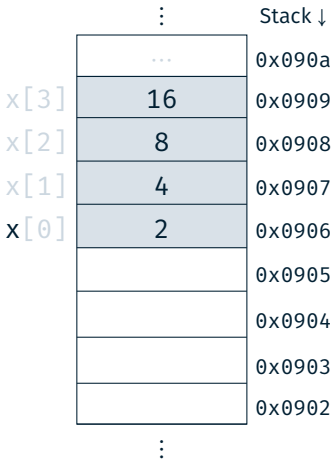
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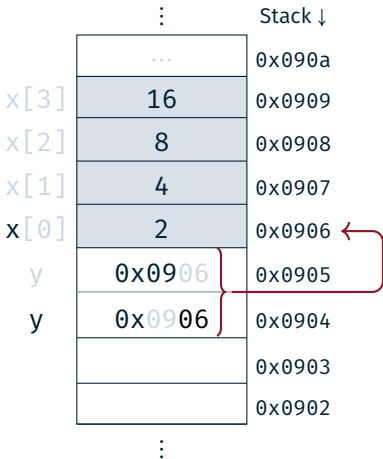
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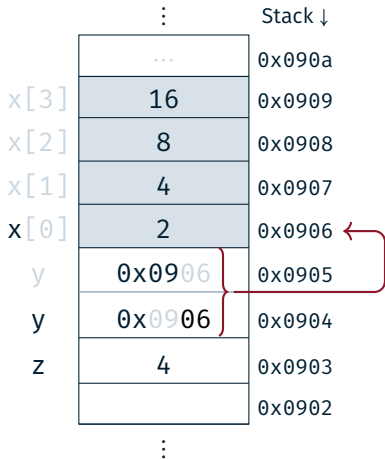
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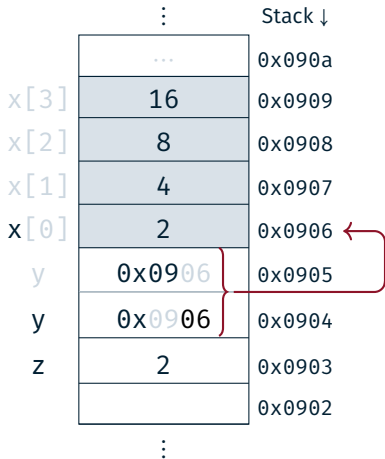
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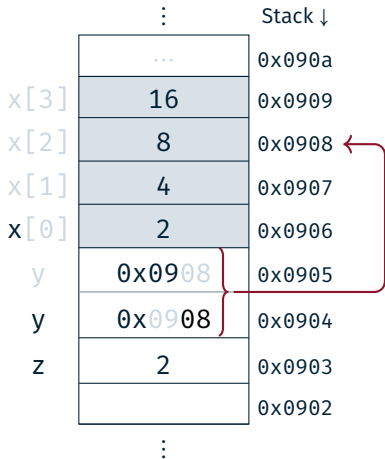
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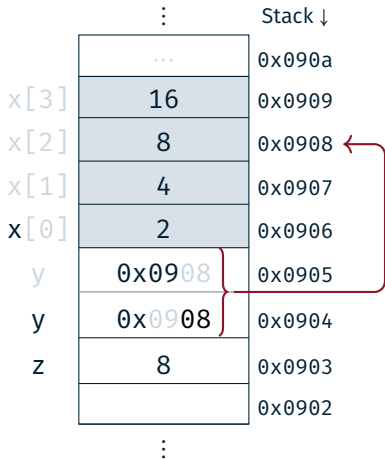
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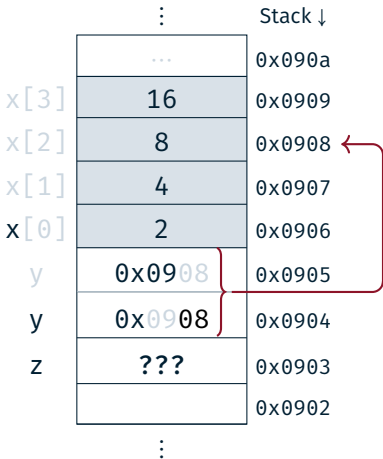


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## Undefined behaviour!

Access to an array outside of the defined area



# Hands-on: Pointers

No Screencast



- Call-by-value vs. call-by-reference
- Pointer and arrays
- Pointer arithmetic
- `struct` for GPS coordinates
- Array of GPS coordinates
- Function pointers

Can be compiled for the SPiCboard (serial console), the SPiCsim or Linux

Source code:

<https://sys.cs.fau.de/extern/lehre/ss26/slp/uebung/material/pointer.c>