

Exercises in System Level Programming (SLP) – Summer Term 2024

Exercise 4

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Lehrstuhl für Verteilte Systeme
und Betriebssysteme



FRIEDRICH-ALEXANDER
UNIVERSITÄT
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TECHNISCHE FAKULTÄT

Presentation Assignment 2

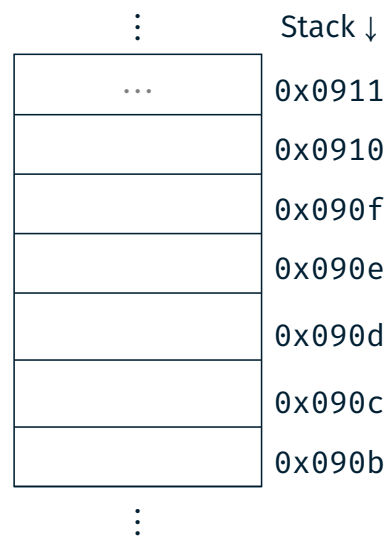
Pointers & Arrays

In depth: Pointers



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

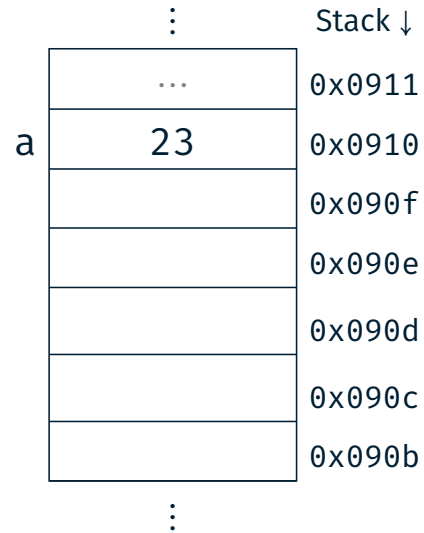
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02 uint8_t b = 42;  
03 uint8_t * p = &a;  
04 *p = 66;  
05 p = &b;  
06 *p -= 40;  
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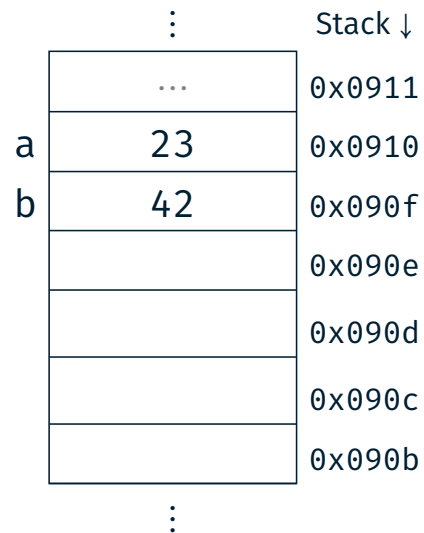


Caution: The exact placement of the variable on the stack depends on the compiler and the chosen optimization level!



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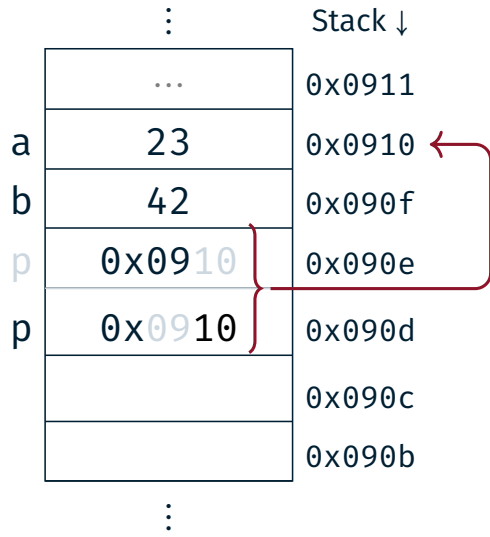


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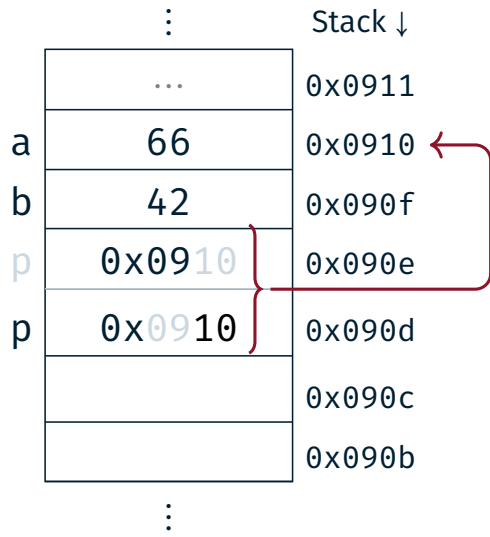


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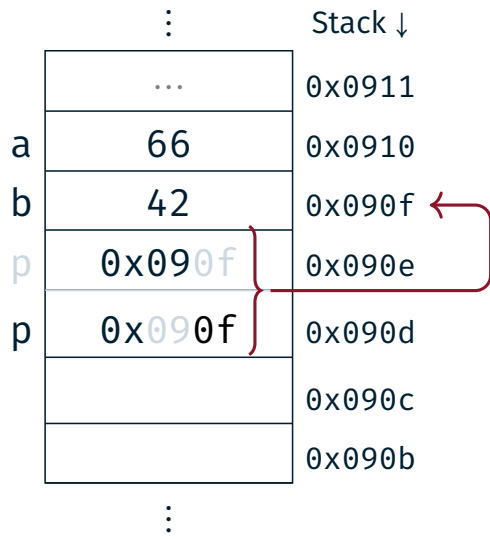
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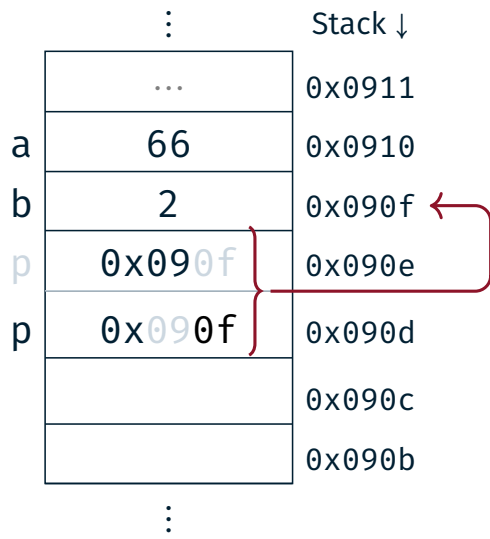
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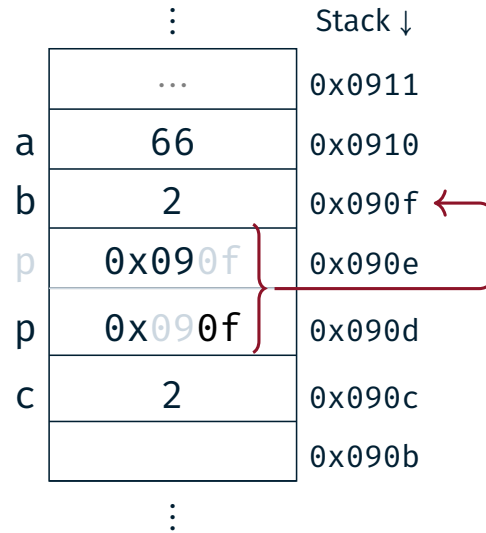
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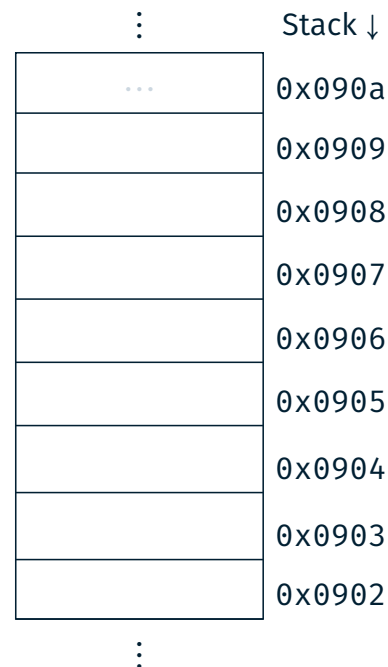
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- Variable pointer: `uint8_t *b`
- Current element: `*b`
- x-th element: `b[x]`
- x-th element: `*(b+x)`

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08 uint8_t x[] = {2,4,8,16};
09 uint8_t *y = x;
10 uint8_t z = x[1];
11 z = *y;
12 y = y+2;
13 z = *y;
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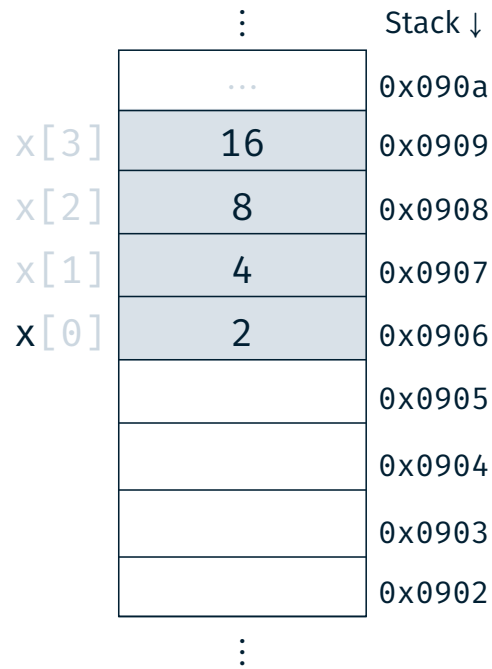




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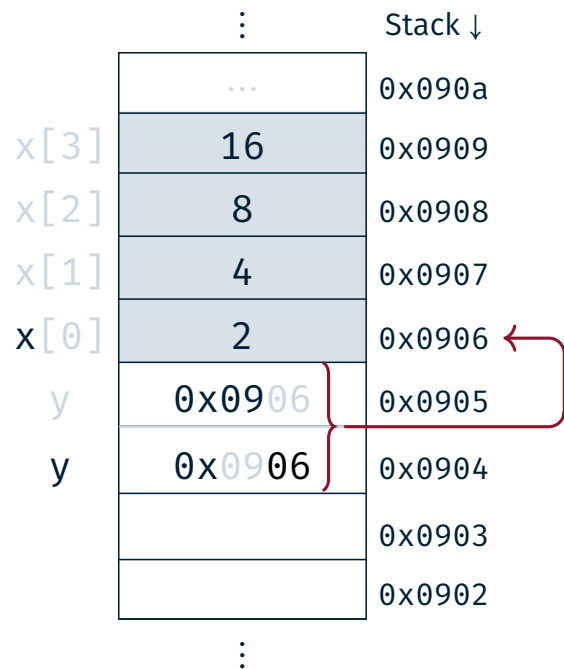
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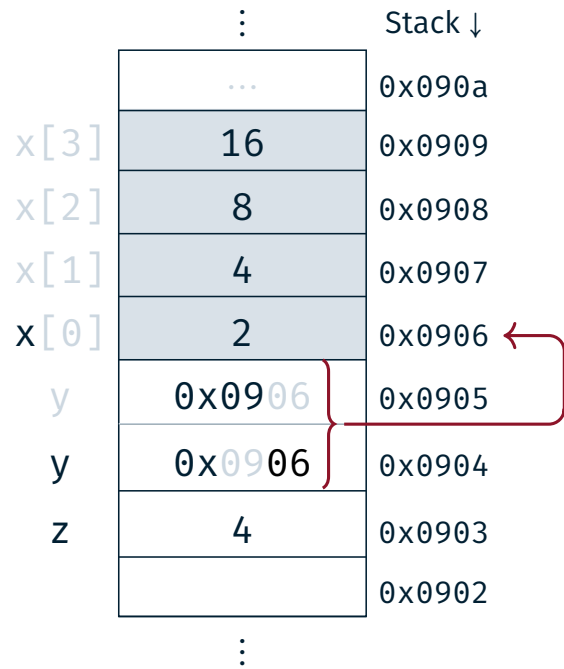




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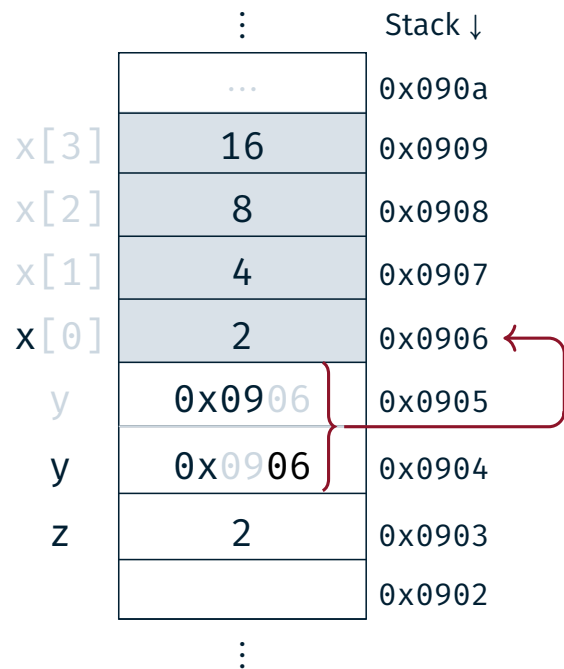
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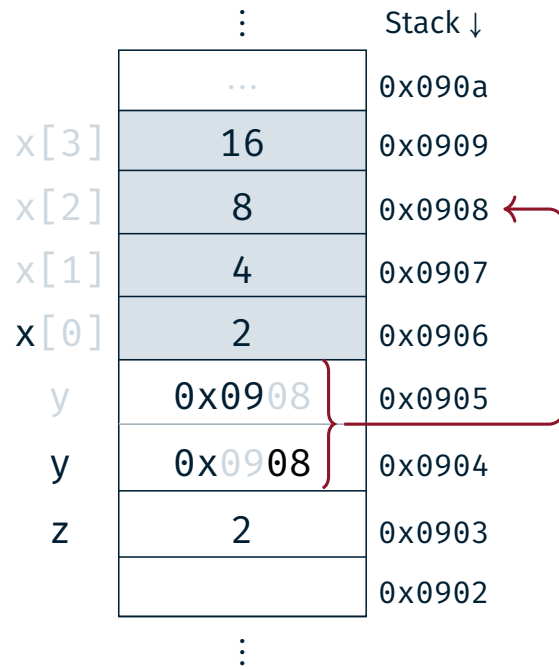




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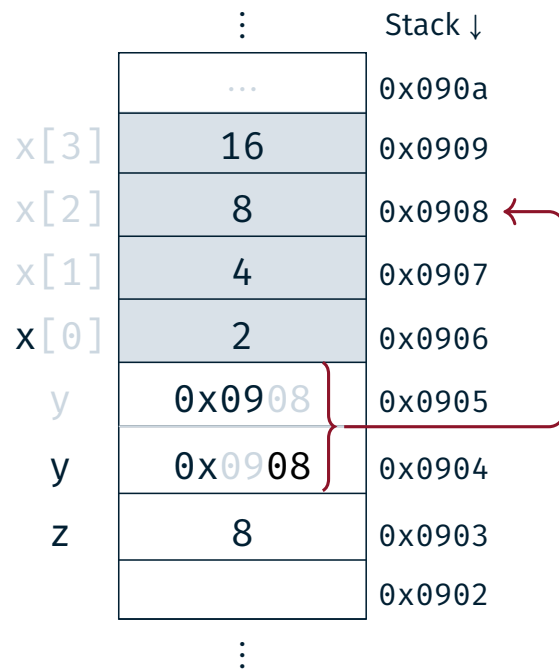
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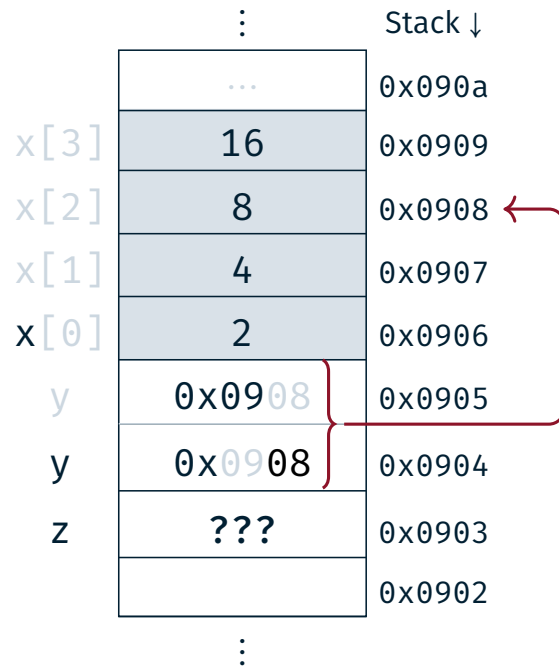




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Hands-on: Pointers

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/ss24/slp/uebung/material/pointer.c>