System-Level Programming

35 Organisation of Memory – Stack

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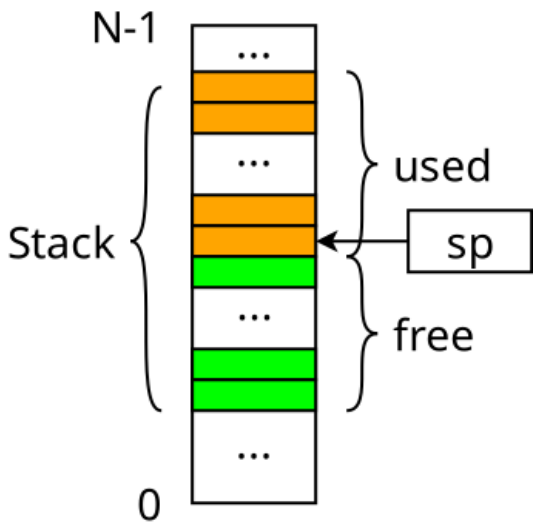
Summer Term 2024

http://sys.cs.fau.de/lehre/ss24

Dynamic Allocation of Memory – Stack

- Local variables, function parameters, and return addresses are organized by the compiler on the stack
- The stack is part of the main memory
- The processor register `sp` "**Stack Pointer**" always points to the last allocated memory on stack
- The stack "grows" "top to bottom'

  $\Rightarrow$ `sp` always points to the start of the stack's used part



Dynamic Allocation of Memory – Stack

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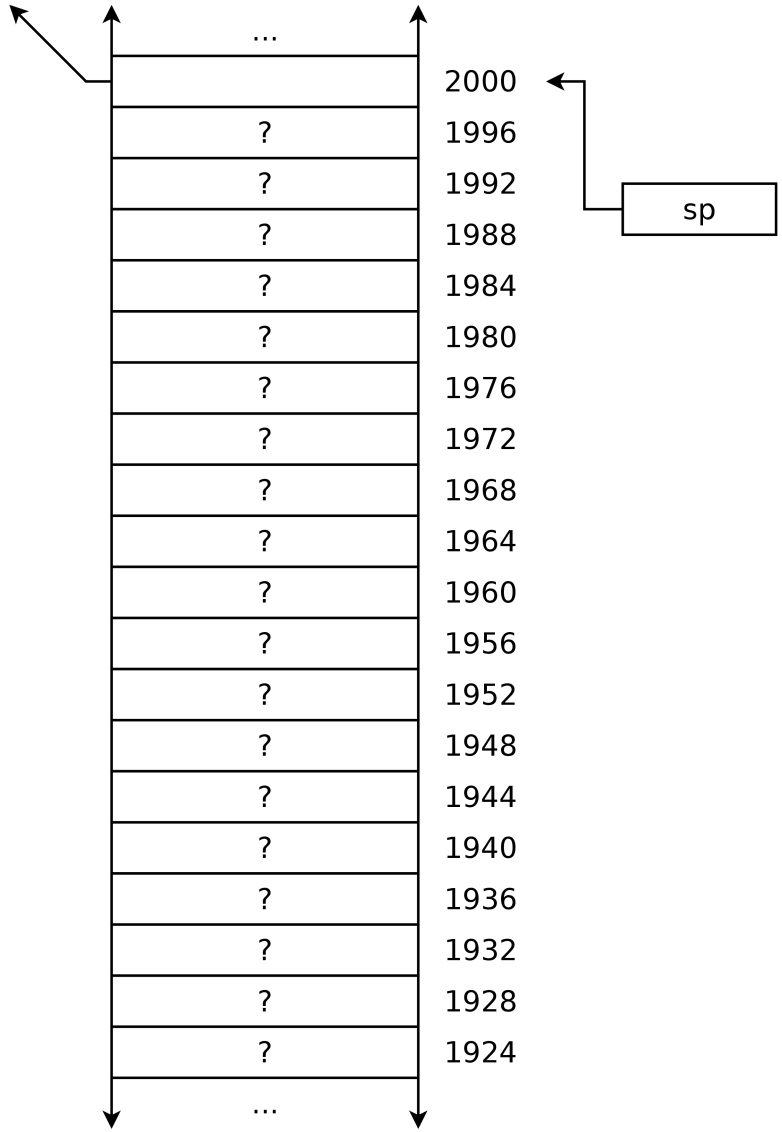

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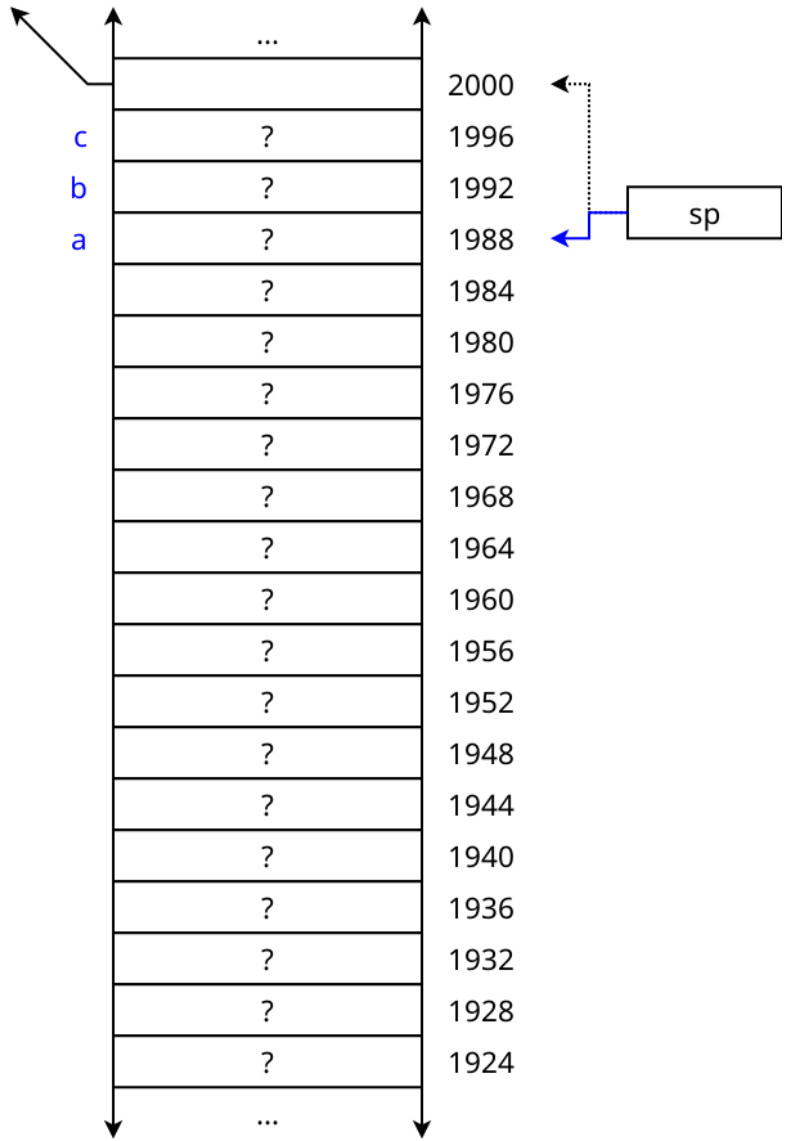
Creating a, b, c



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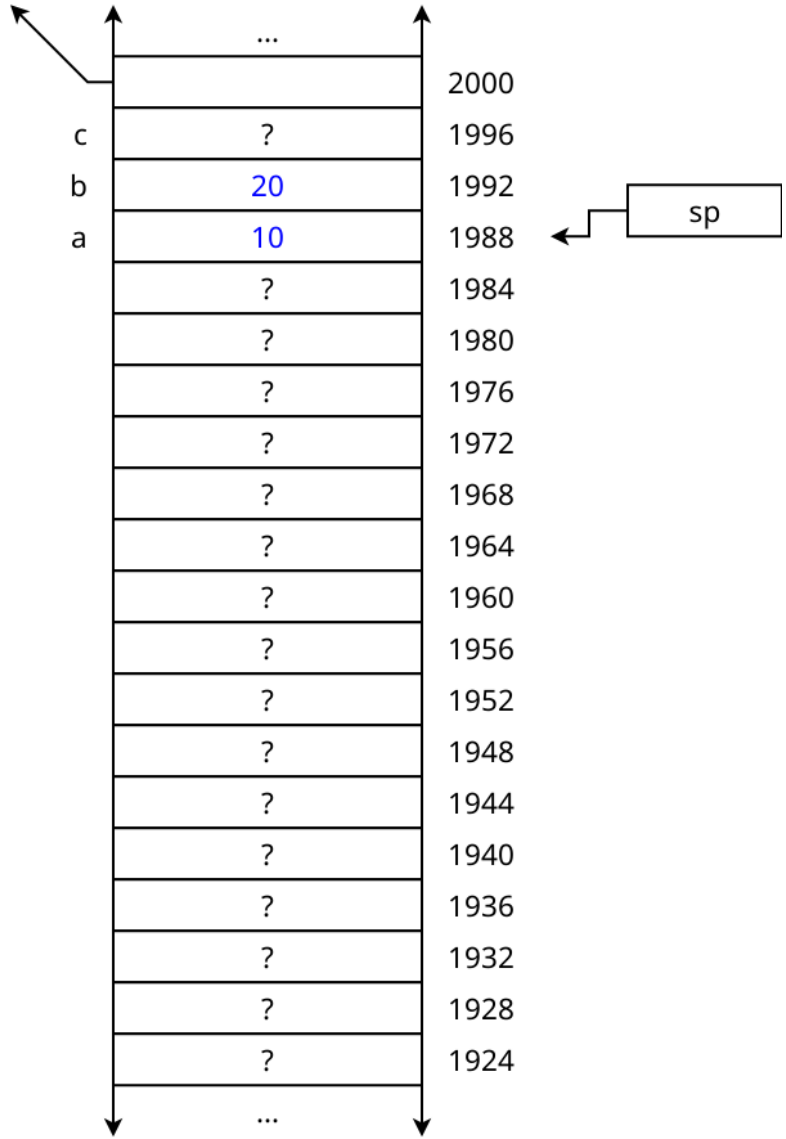
Writing of a, b



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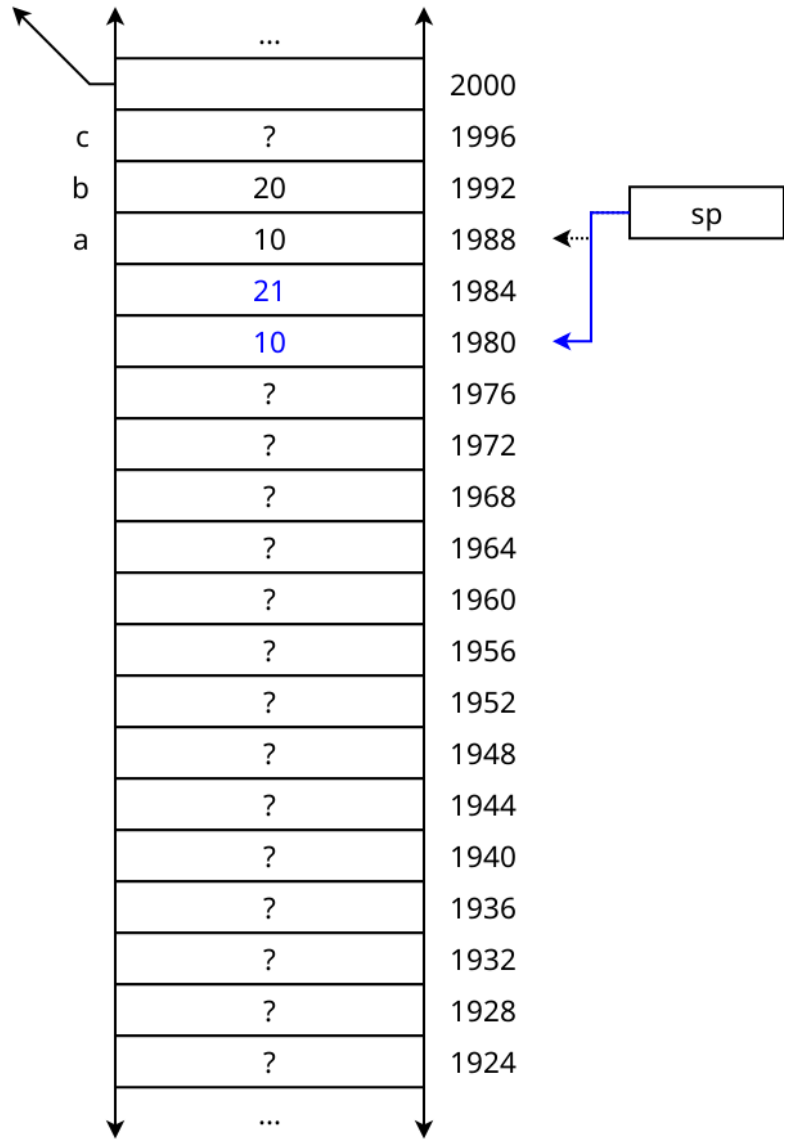
Calculating parameters



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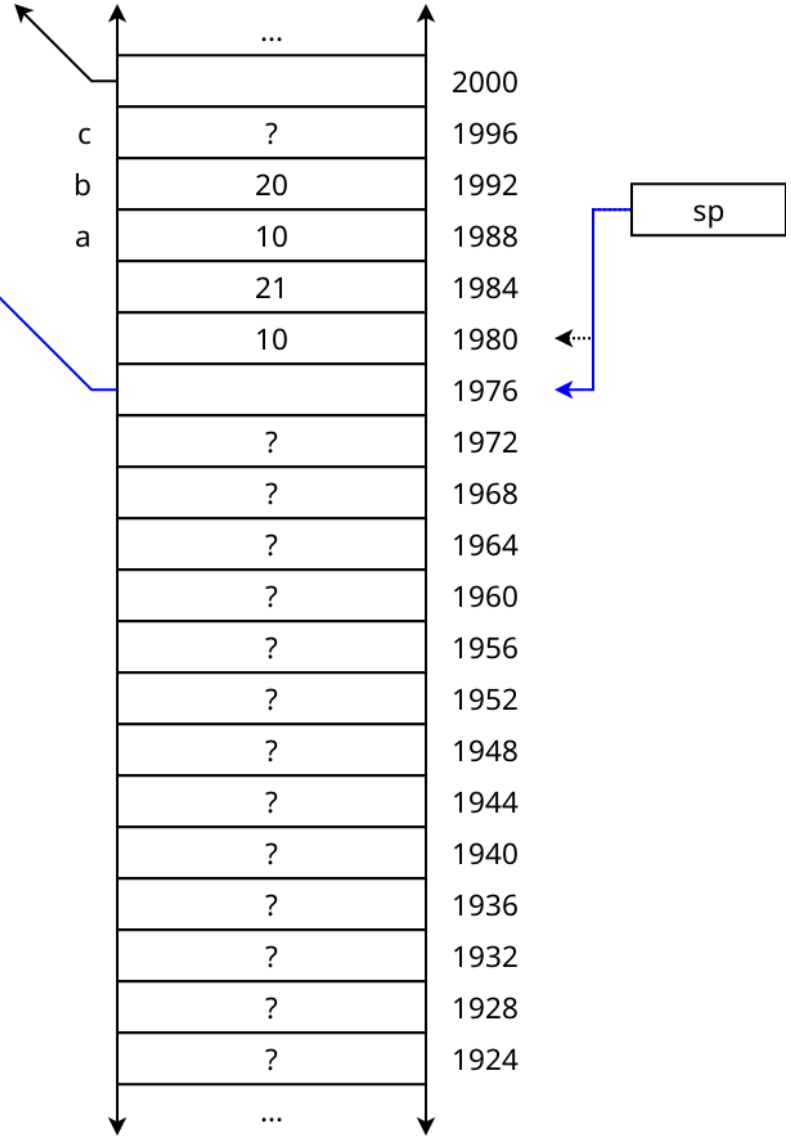
Storing the return address



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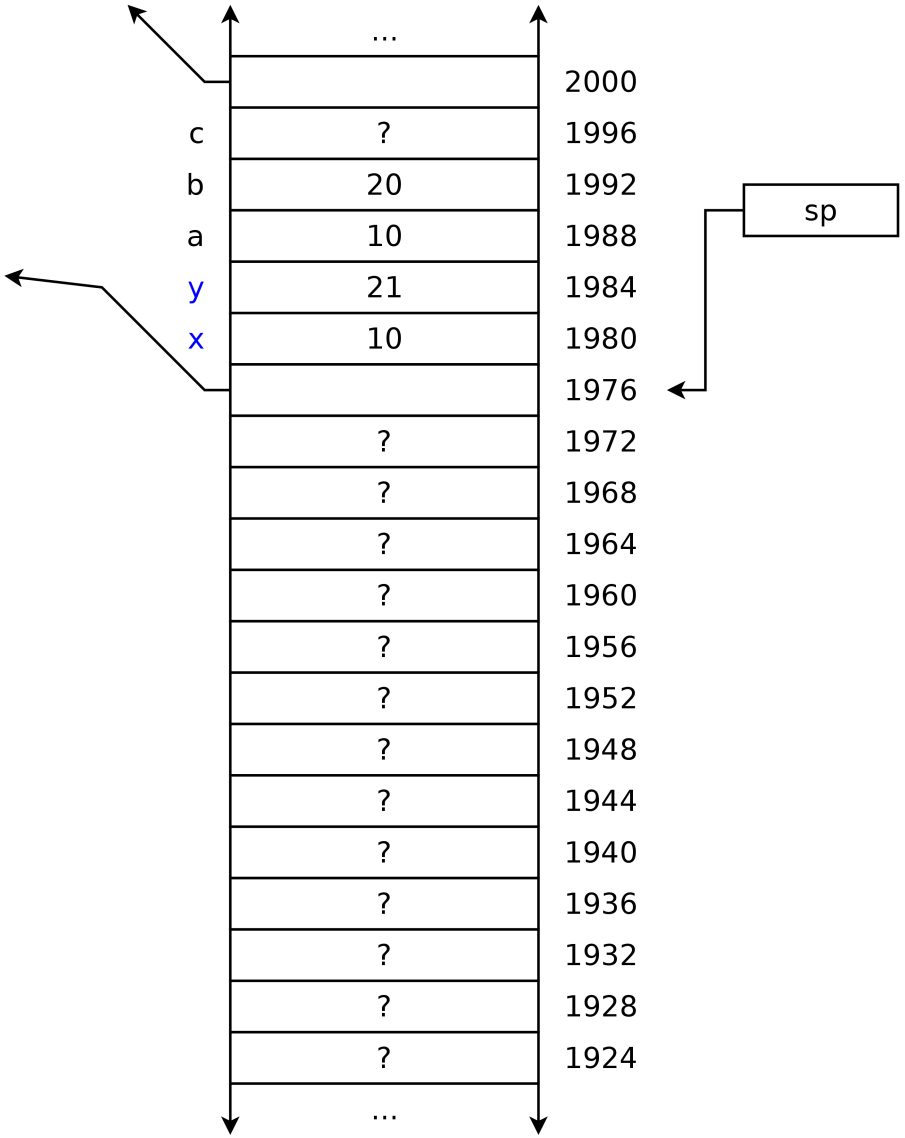
Start f1



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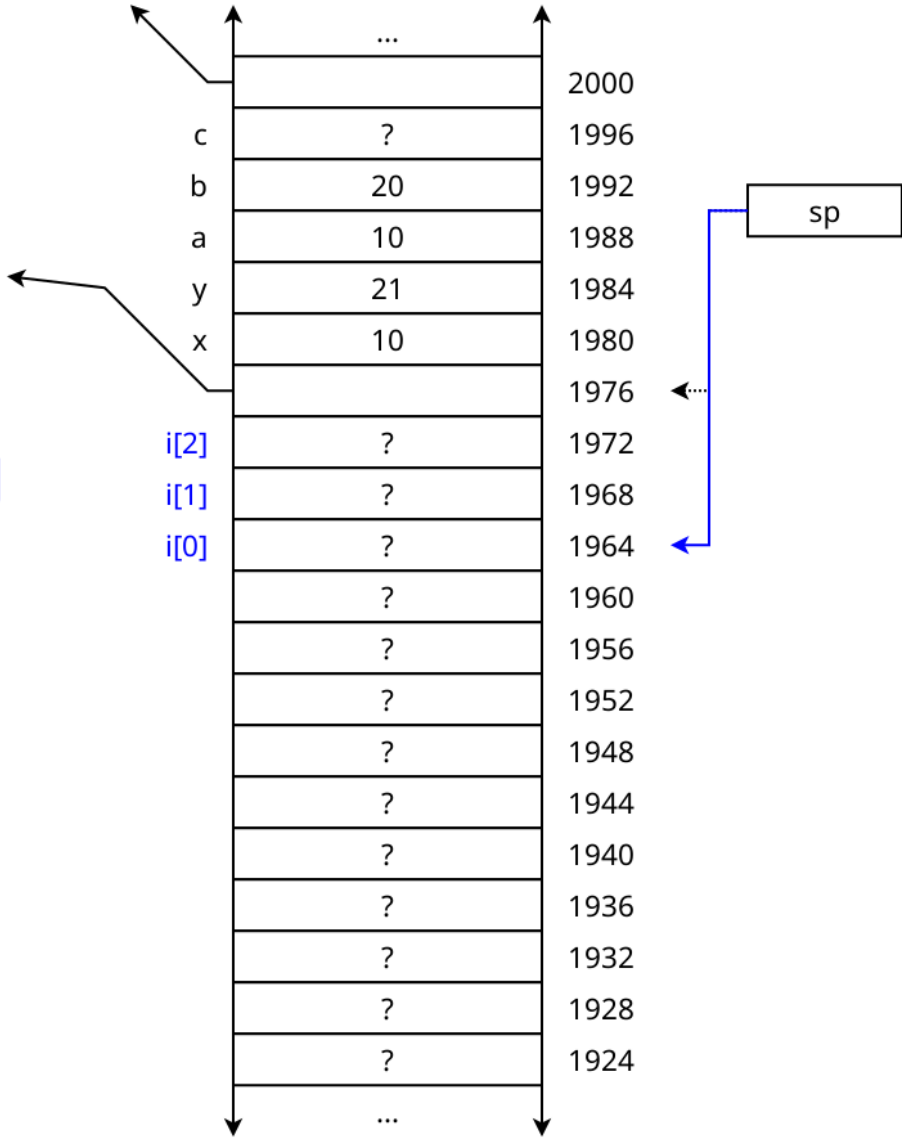
```

Creating i[0]...i[2]



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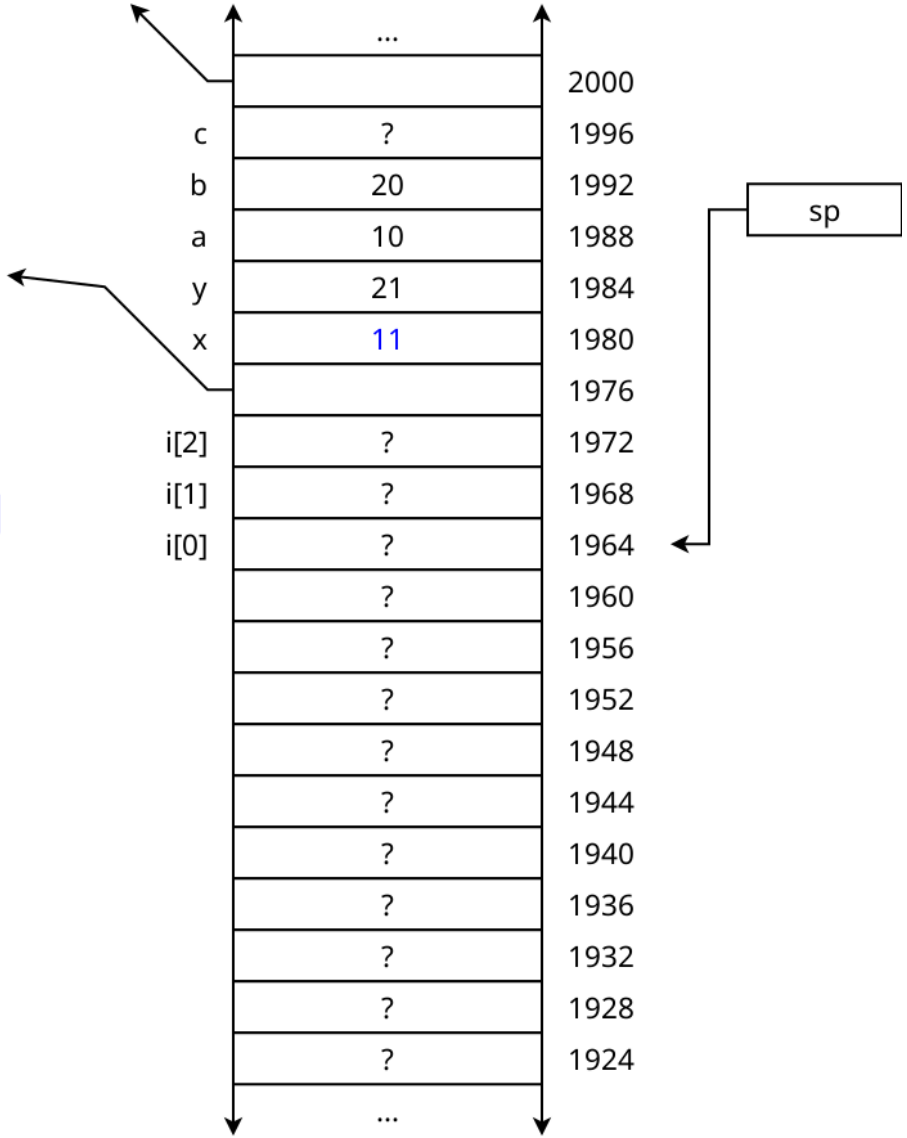
Incrementing x



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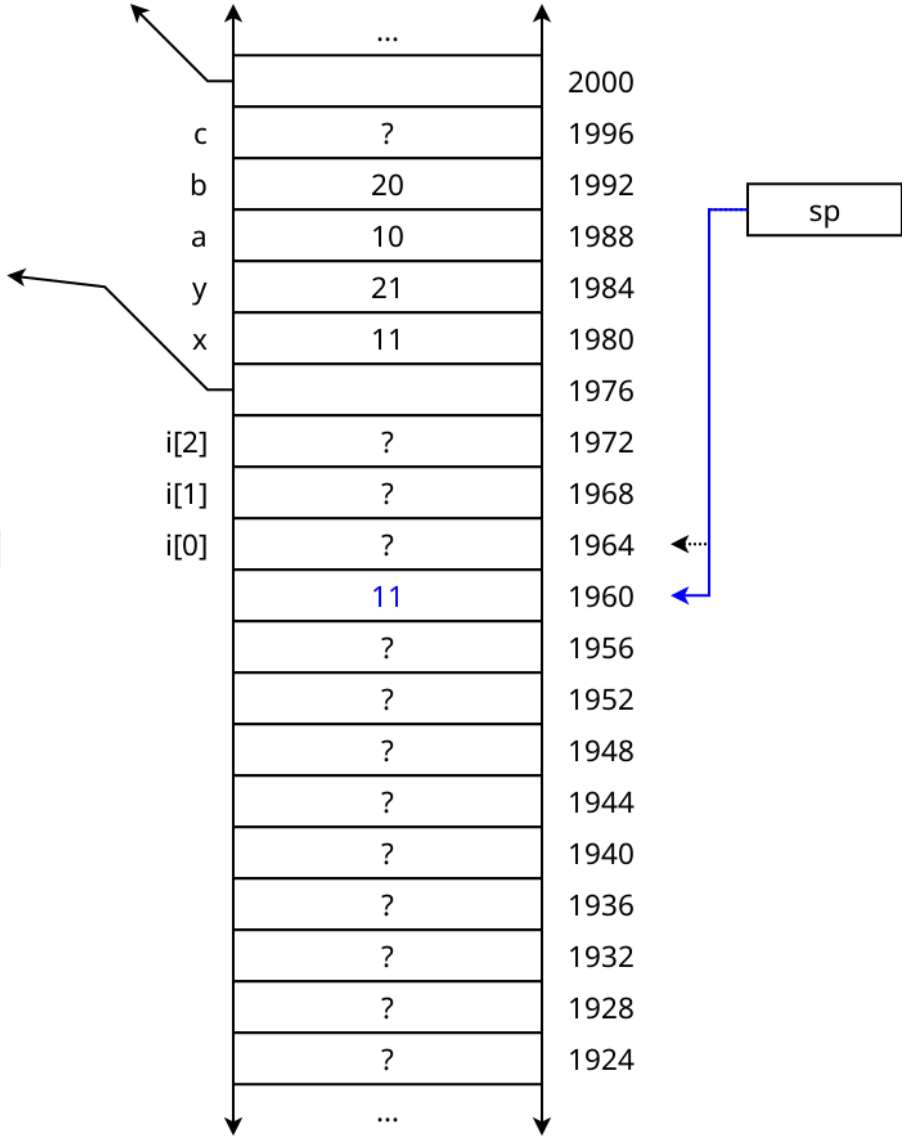
Calculation of the parameter



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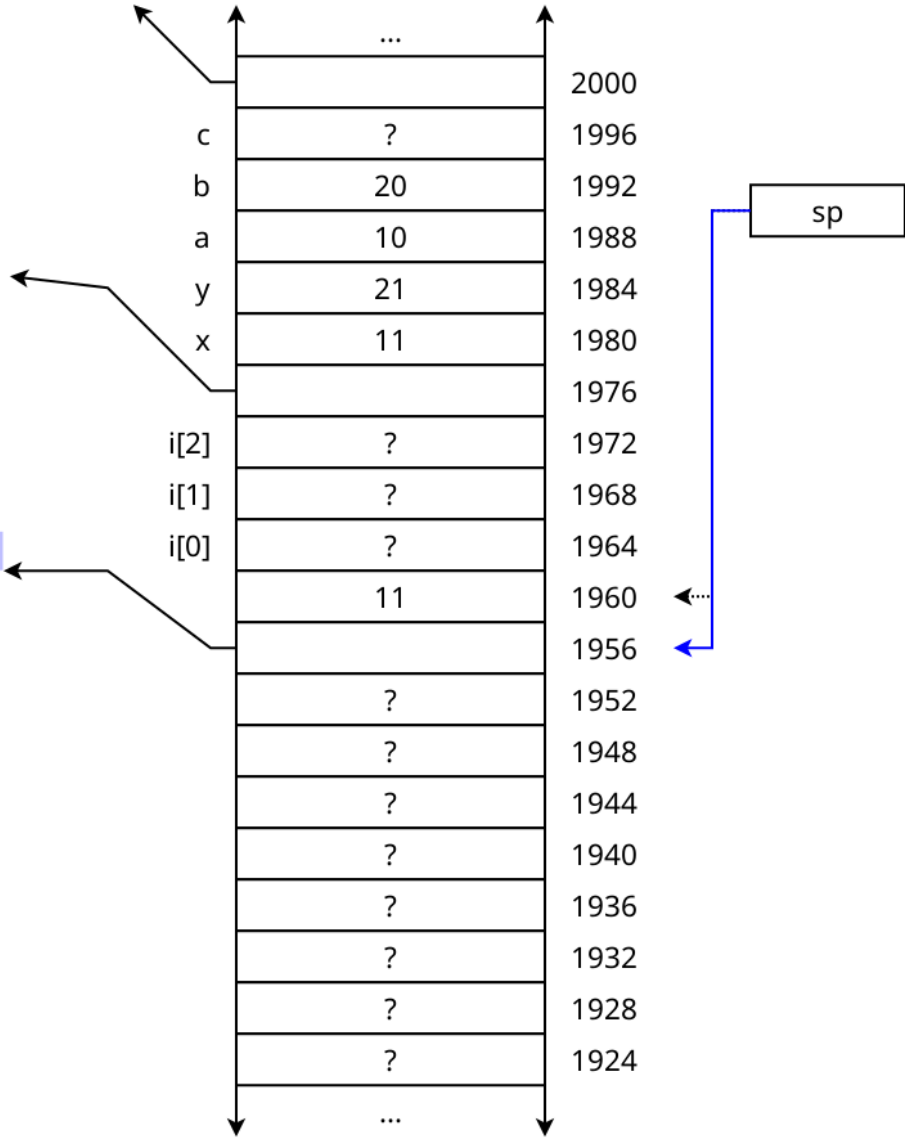
Storing the return address



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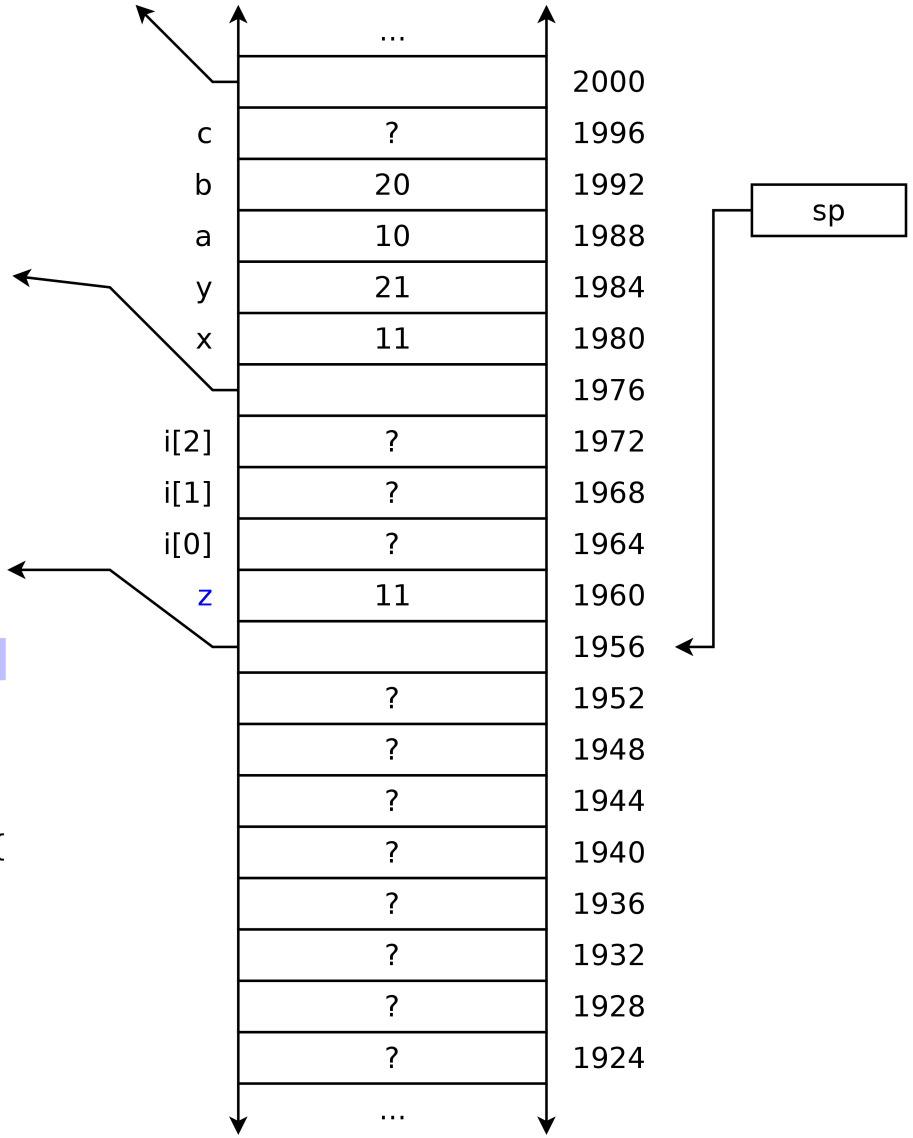
Start f2



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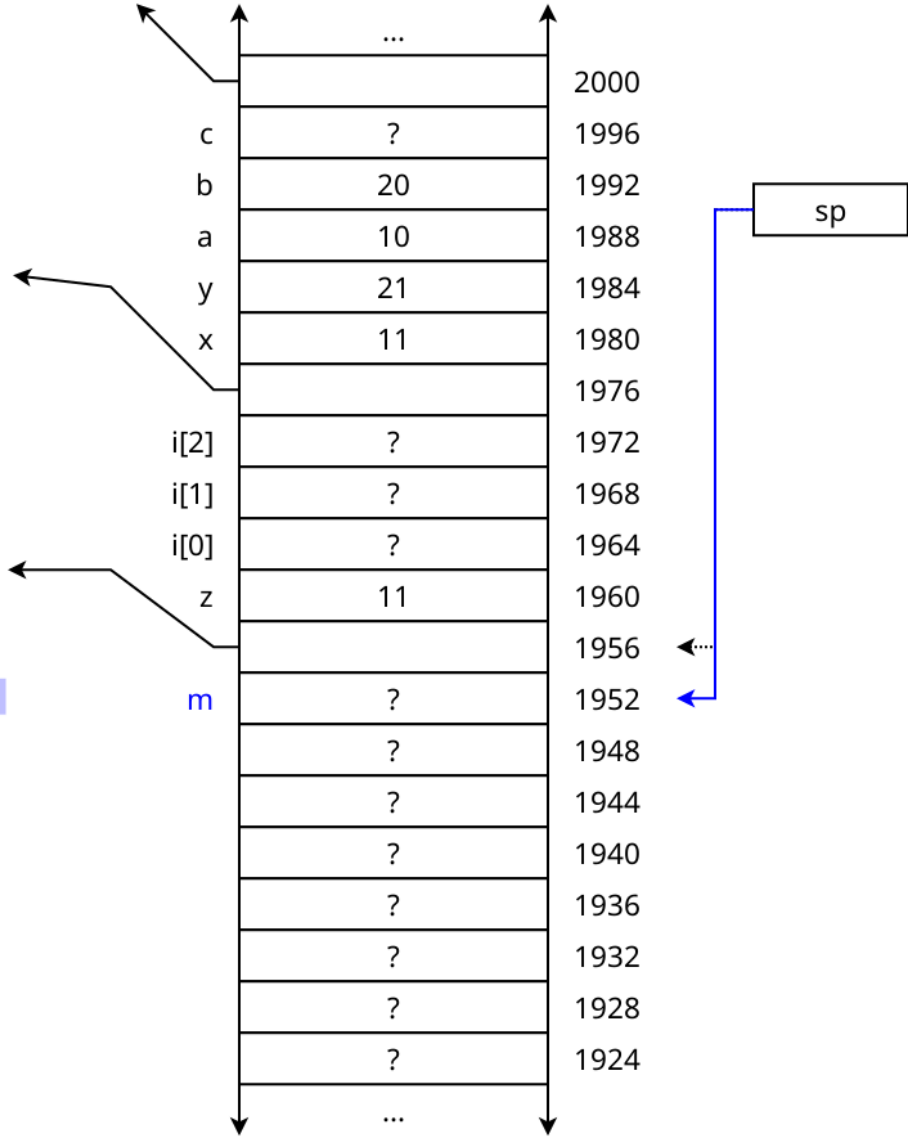
Creating m



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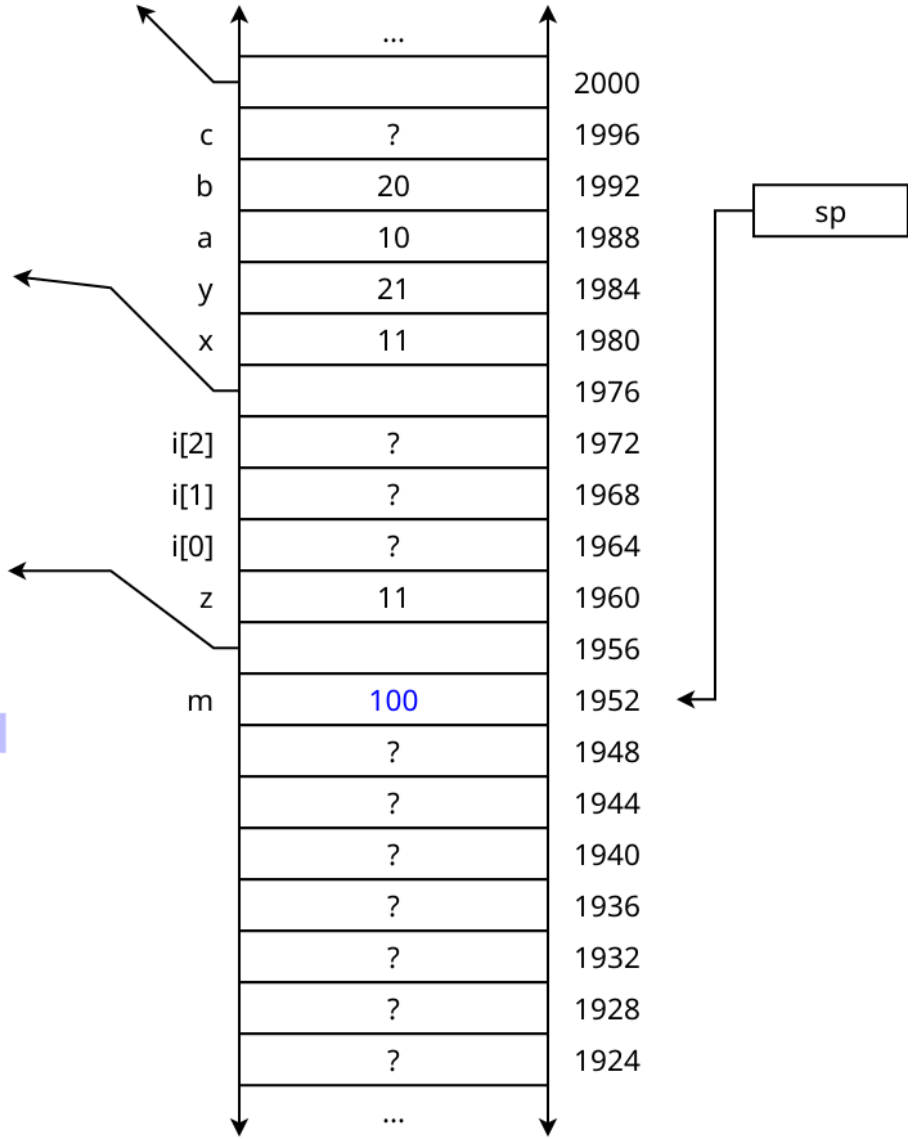
Writing of m



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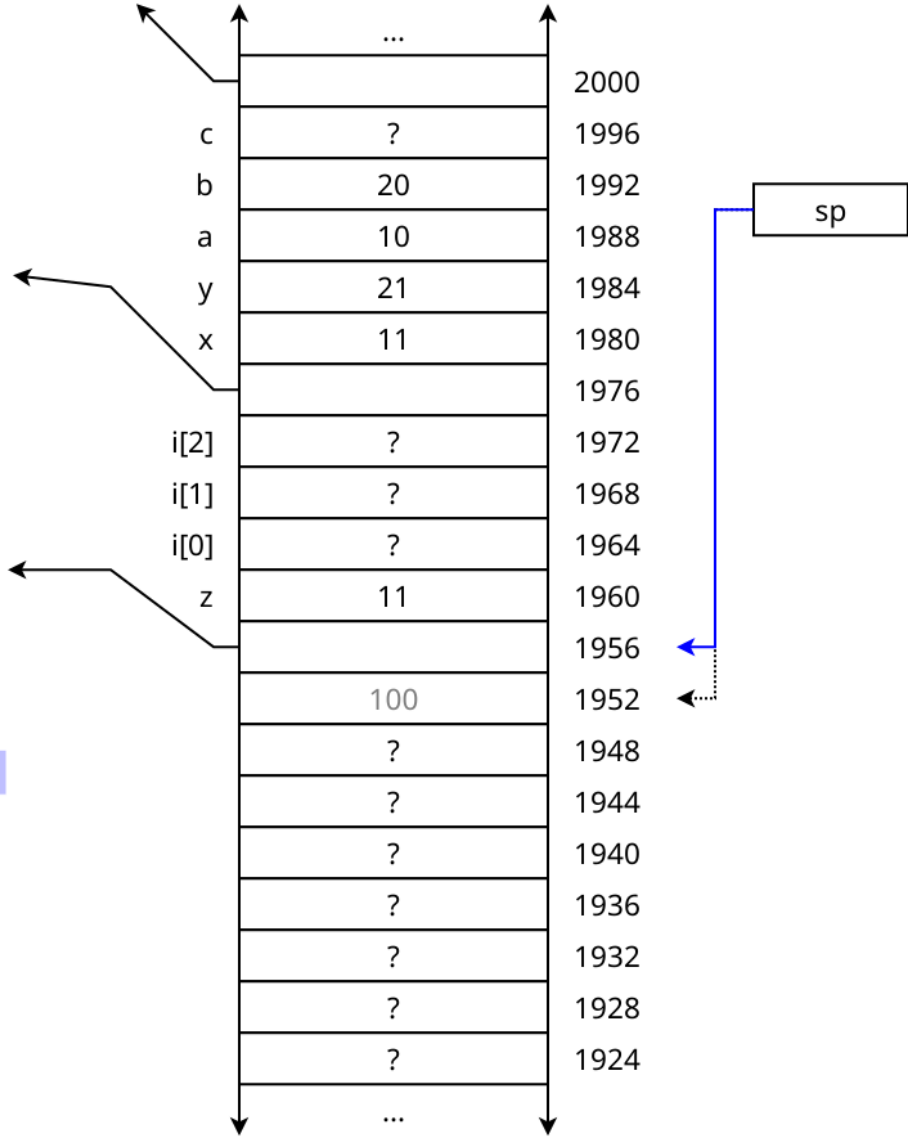
Removing m



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Return
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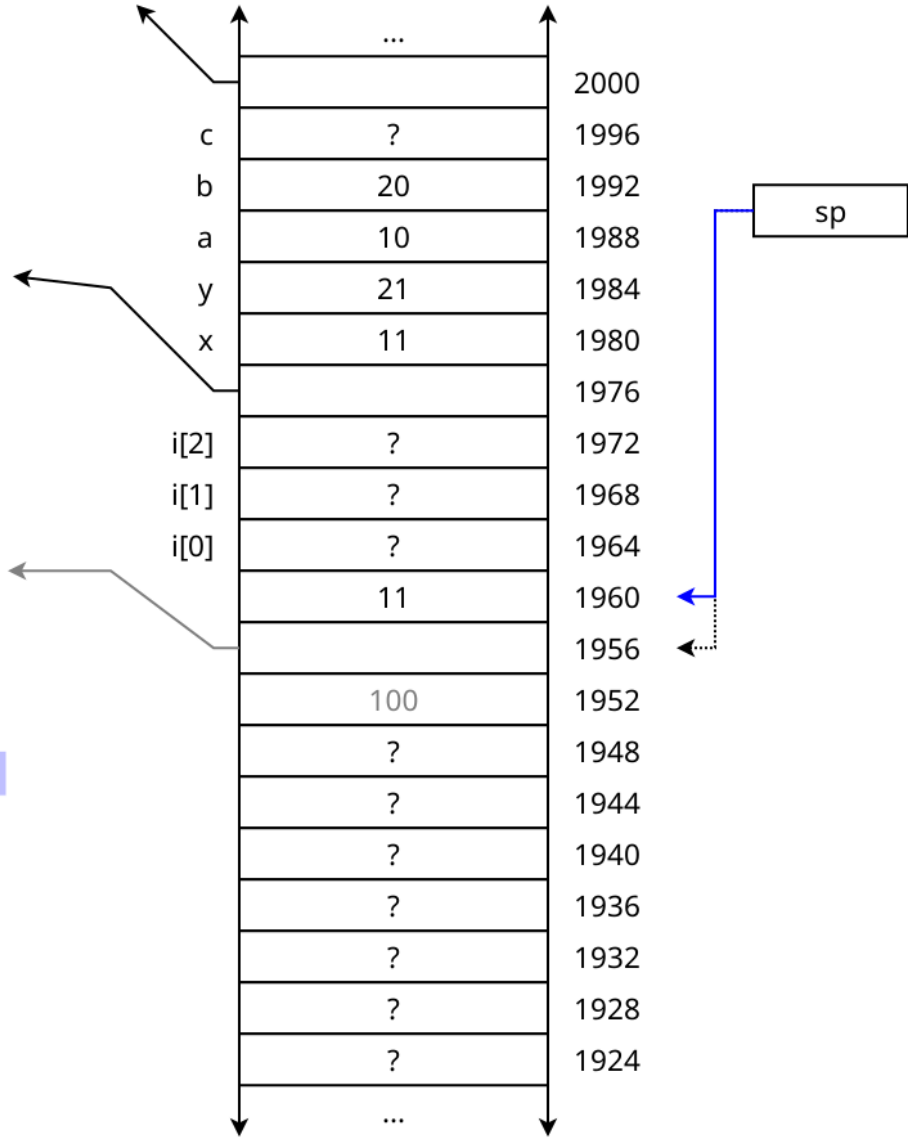

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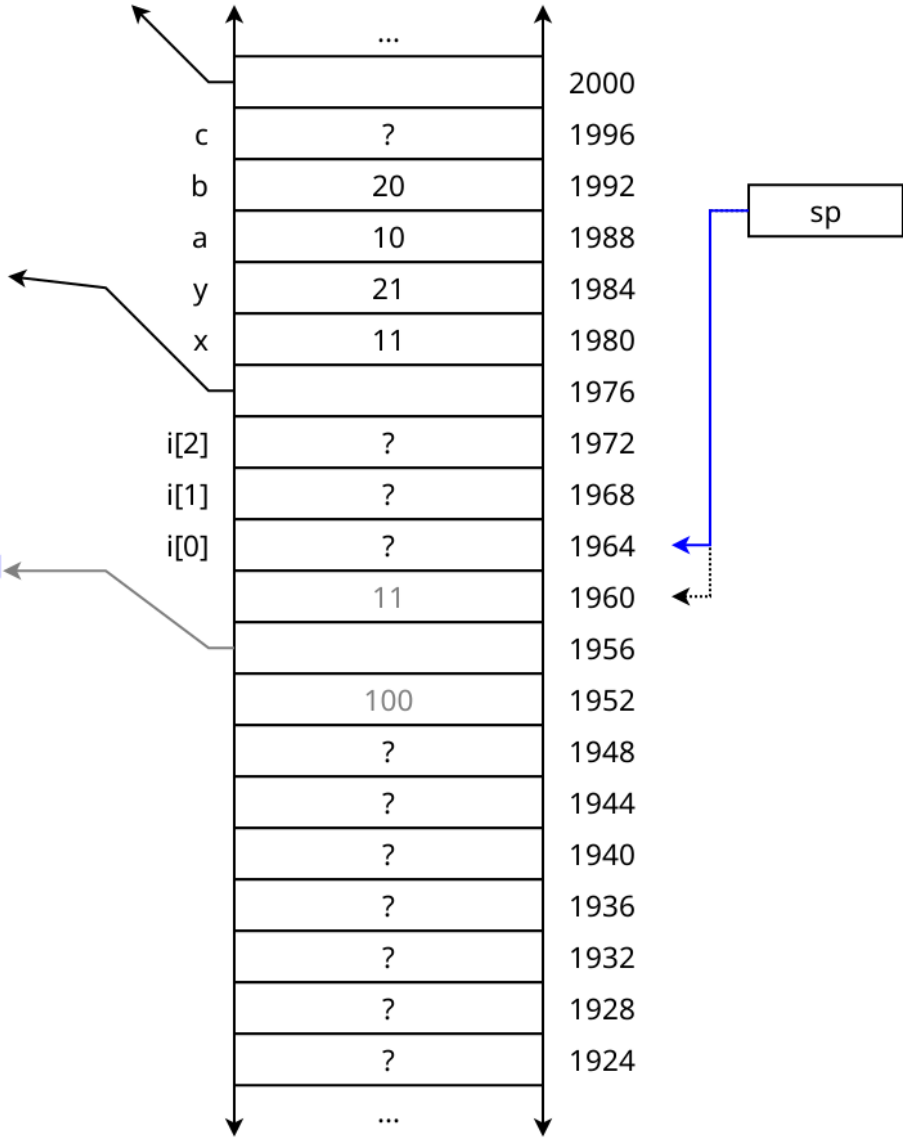
Removing the parameter



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Removing i[0]...i[2]
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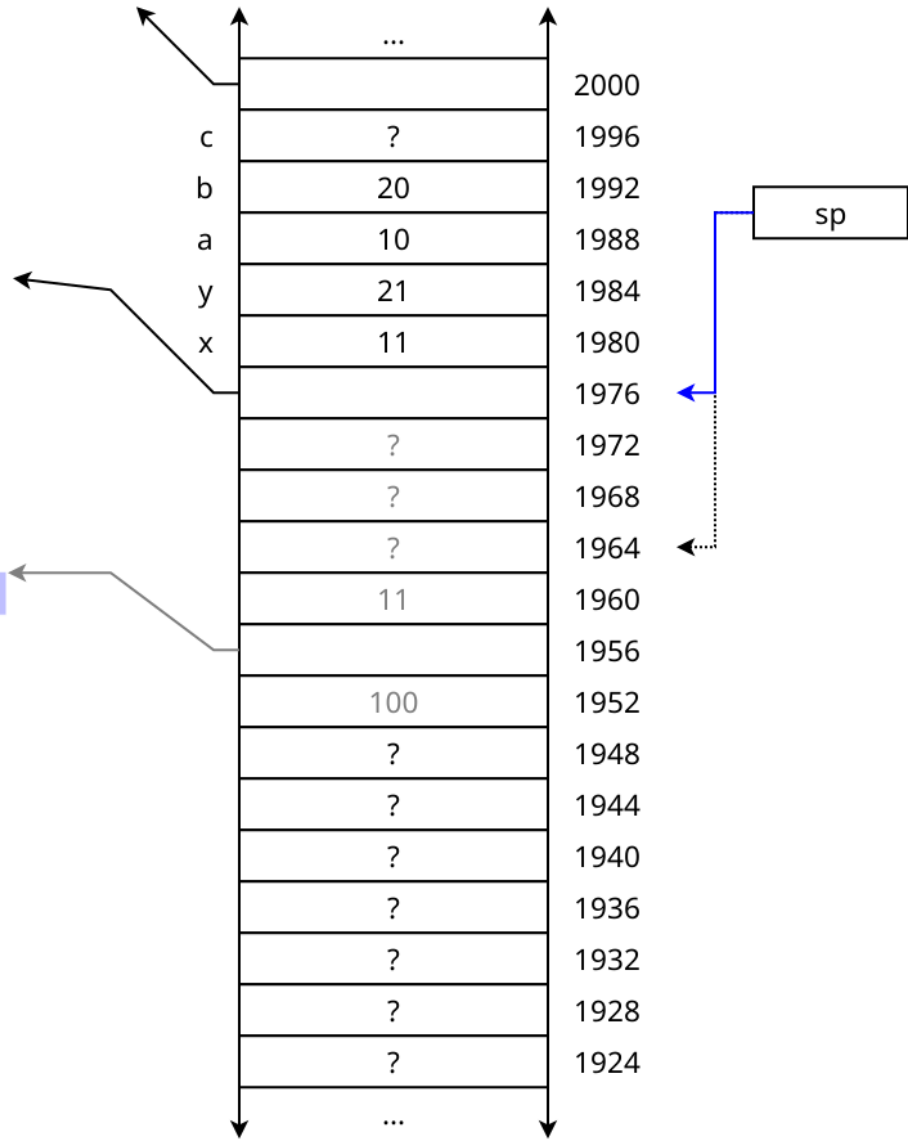

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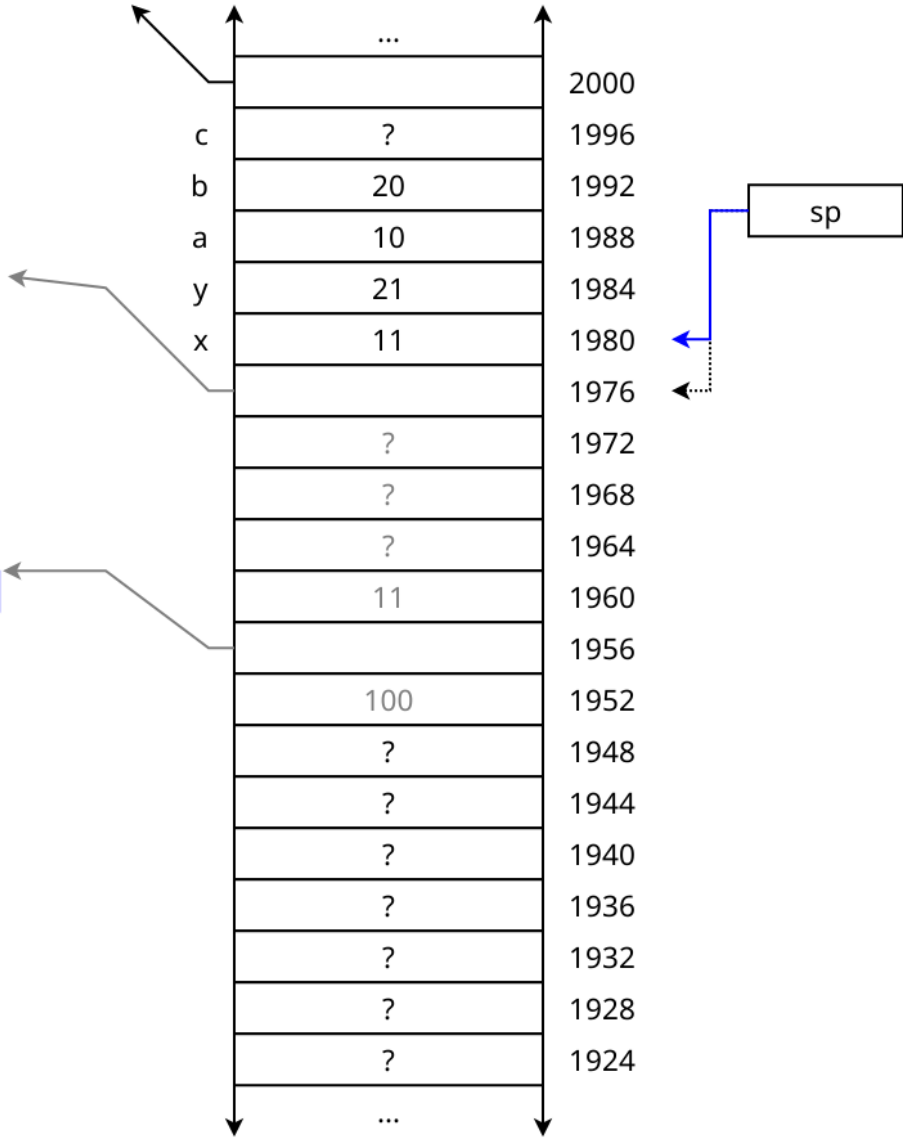

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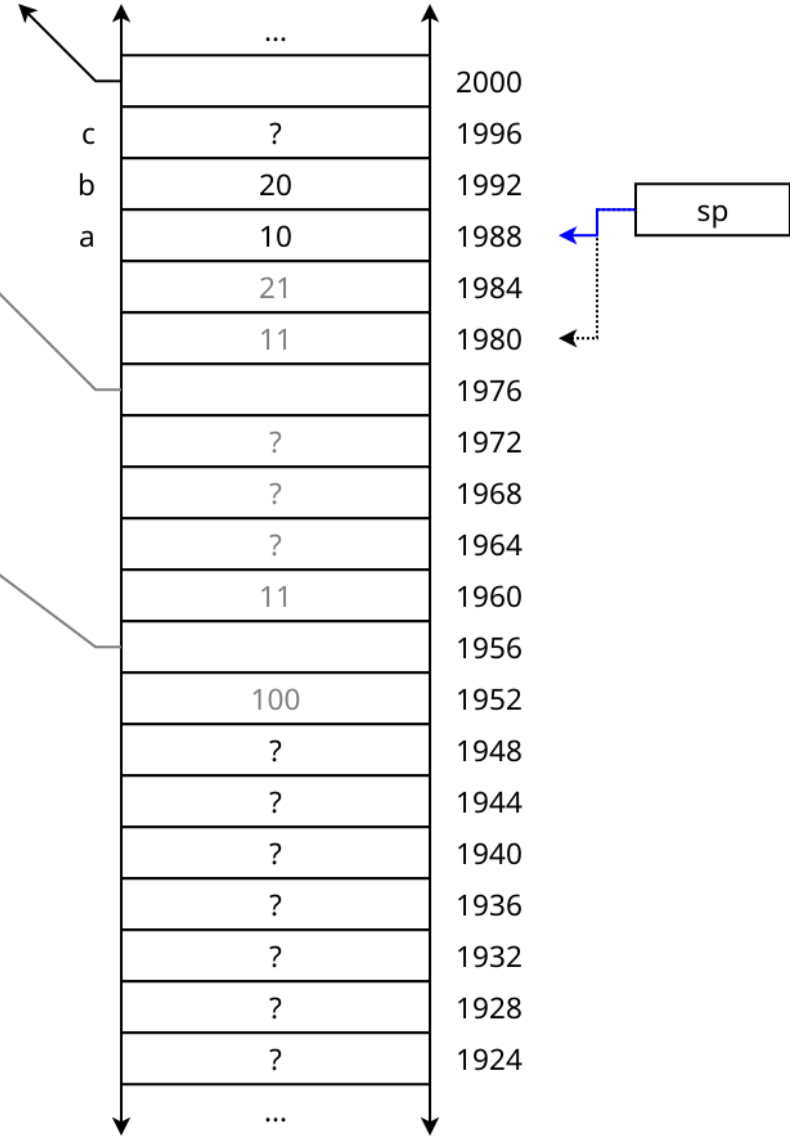
Removing the parameters



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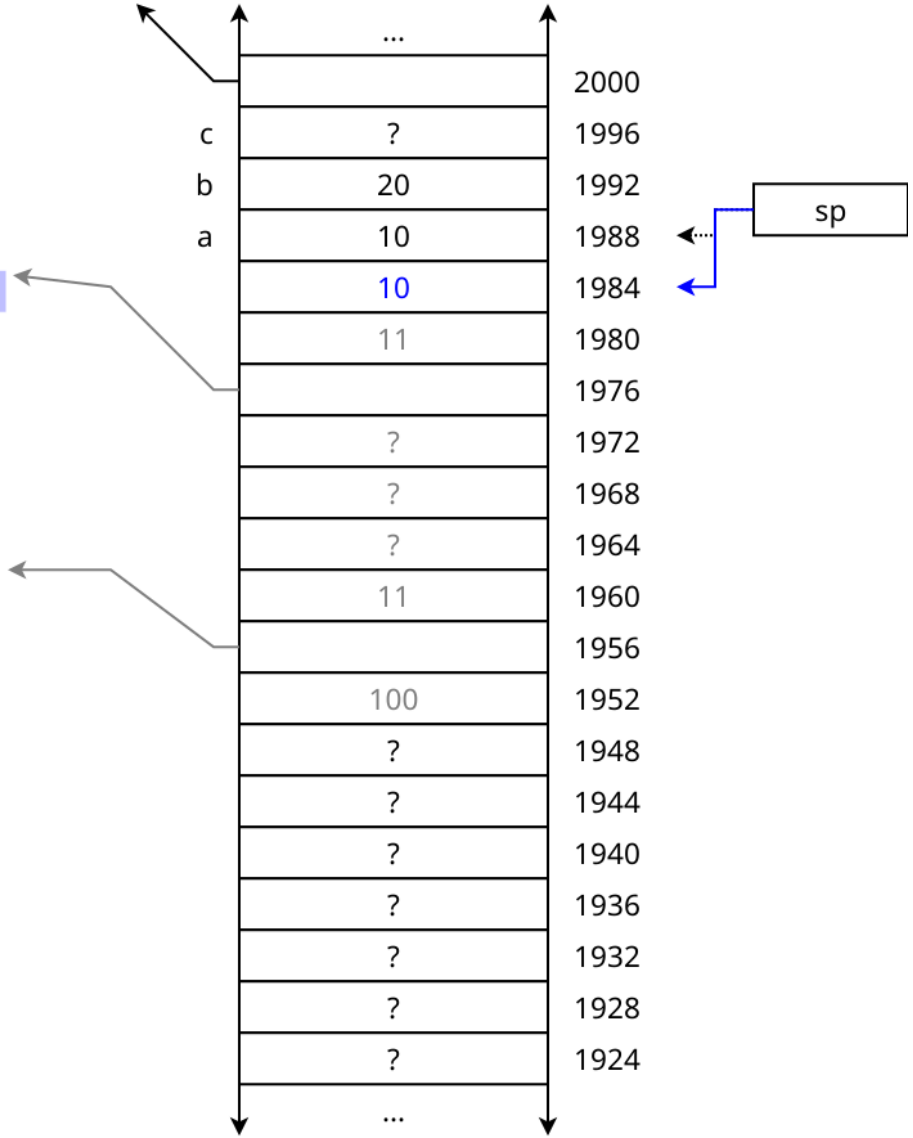
Calculating the parameter



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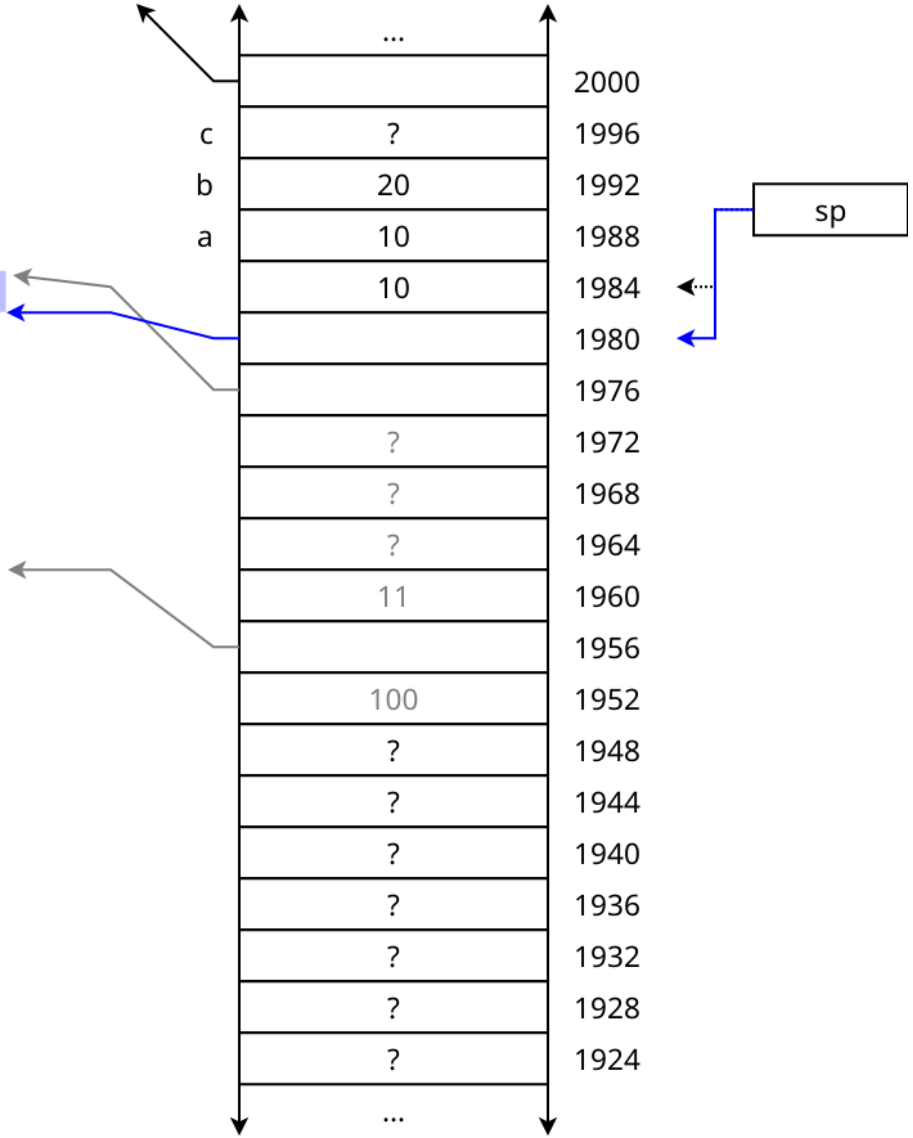
Storing the return address



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Start f3
```