Subprograms

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Subprograms

- Subprogram is a code segment that performs a function that returns a value
- It can be invoked from anywhere in the main program
- Reusable
- Can be compiled separately and linked to the main program from a library

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History

- Idea dates back to 1949 (Atlas @ U Manchester)
- Motivations:
  - Modularity
  - Information hiding
  - Reuse
- Subprogram call takes parameters (inputs) and produces a result value (output)
- After ALGOL 60, subprograms were called “procedures” or “functions”
- Procedure invocation appears as a single computational step to the caller

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In This Module

- Chapter 1: Standard model for procedure activation
  - Use of call stack of activation records
  - Desired operation of call and return
  - Design of CALL and RET instructions
- Chapter 2: Contour model for procedure activation in block-structured programming languages
  - Blocks are called “contours”
  - Contours can be embedded hierarchically
  - Contours can access variables of enclosing blocks
- Chapter 3: Machines chapter from *Great Principles of Computing*
  - More background on stack machine structures

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