CSCI 334:
Principles of Programming Languages

Lecture 5: PL Fundamentals

Instructor: Dan Barowy

Williams

Announcements

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Google summer internships

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HW2 grades out

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Project presentation date:
December 11; last day of reading period

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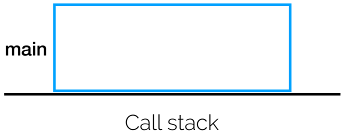

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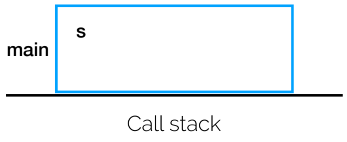

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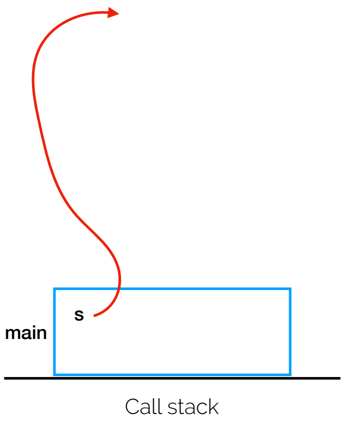

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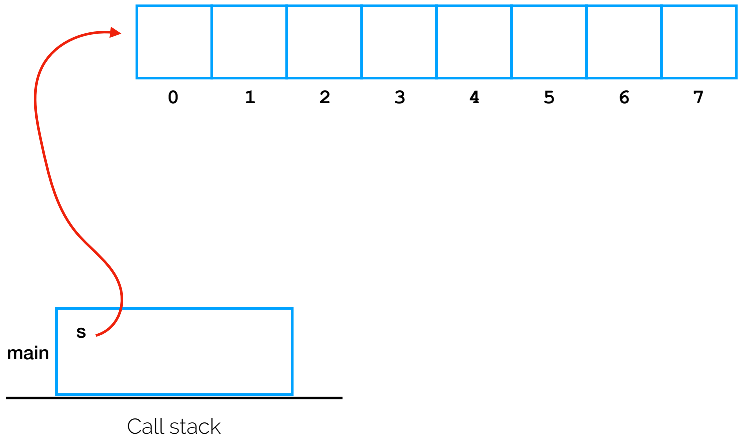

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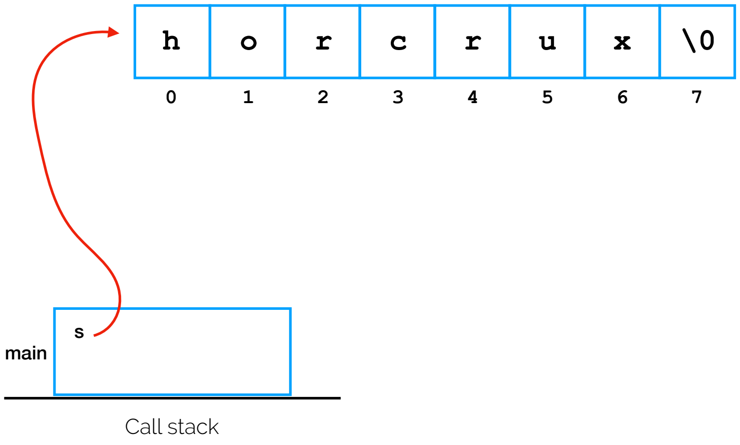

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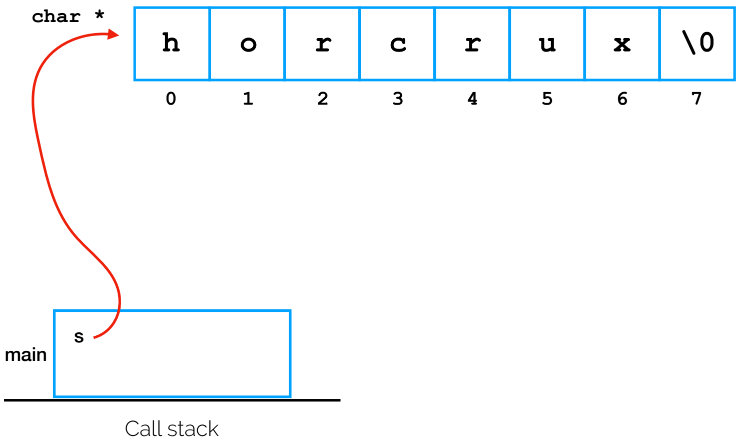

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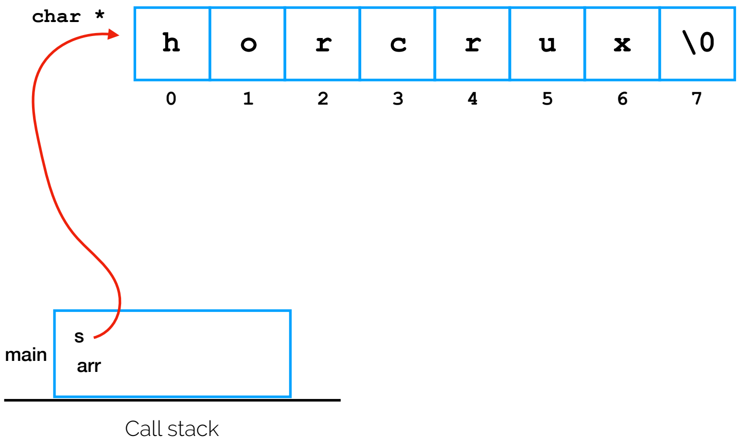

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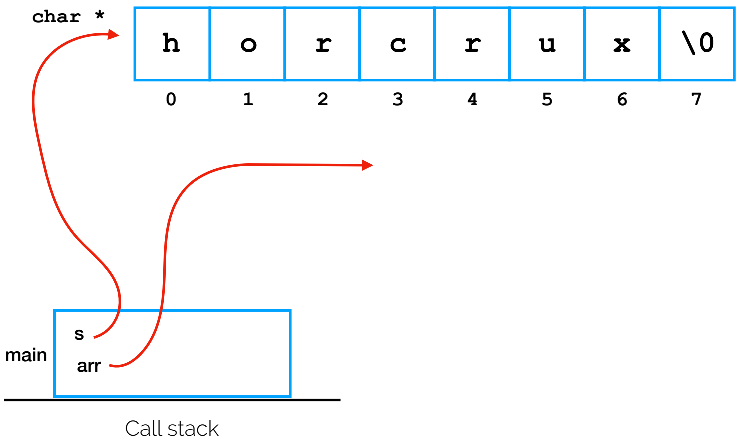

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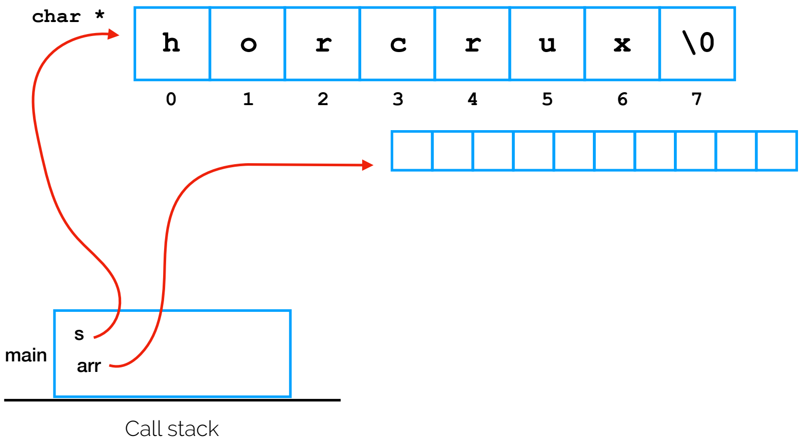

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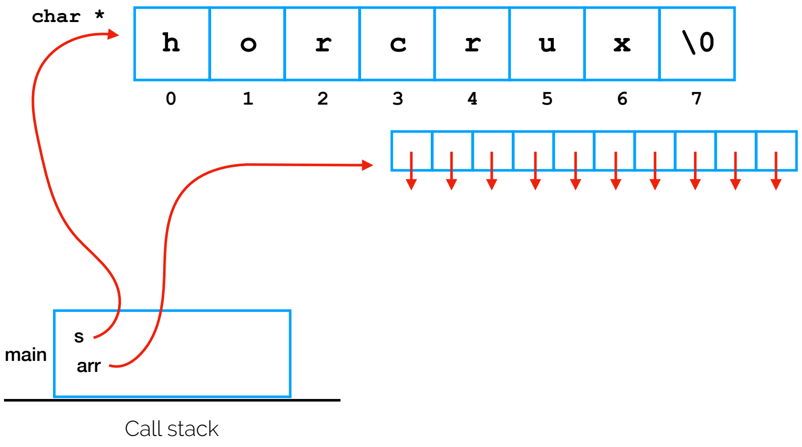

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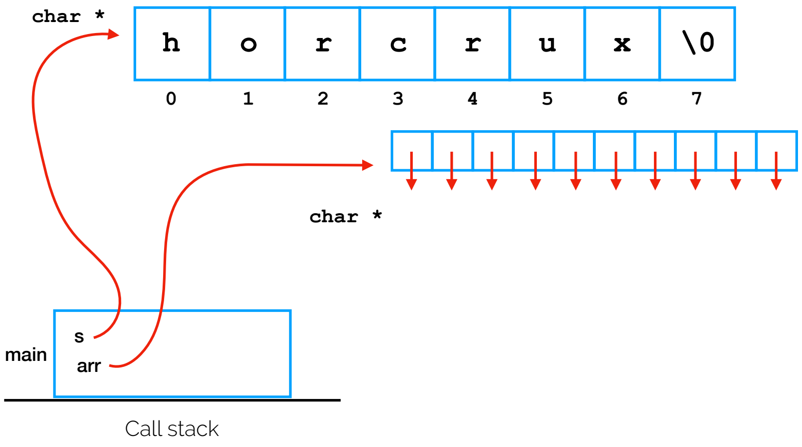

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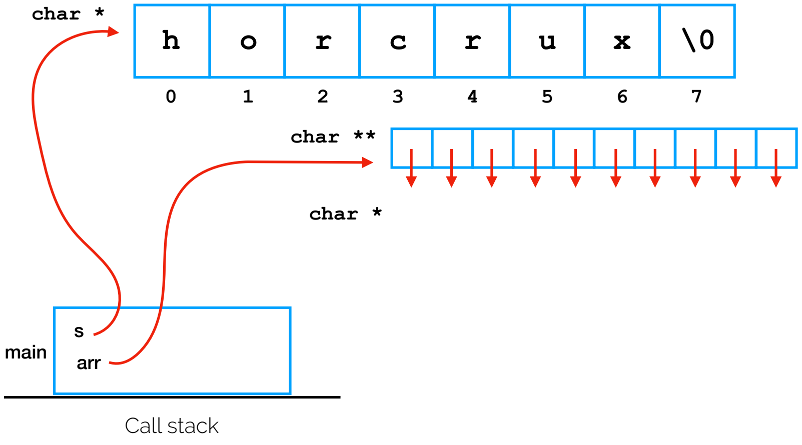

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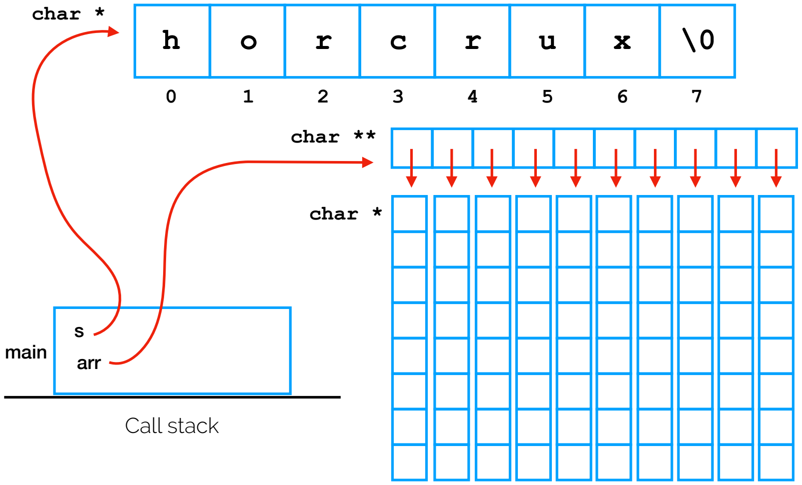

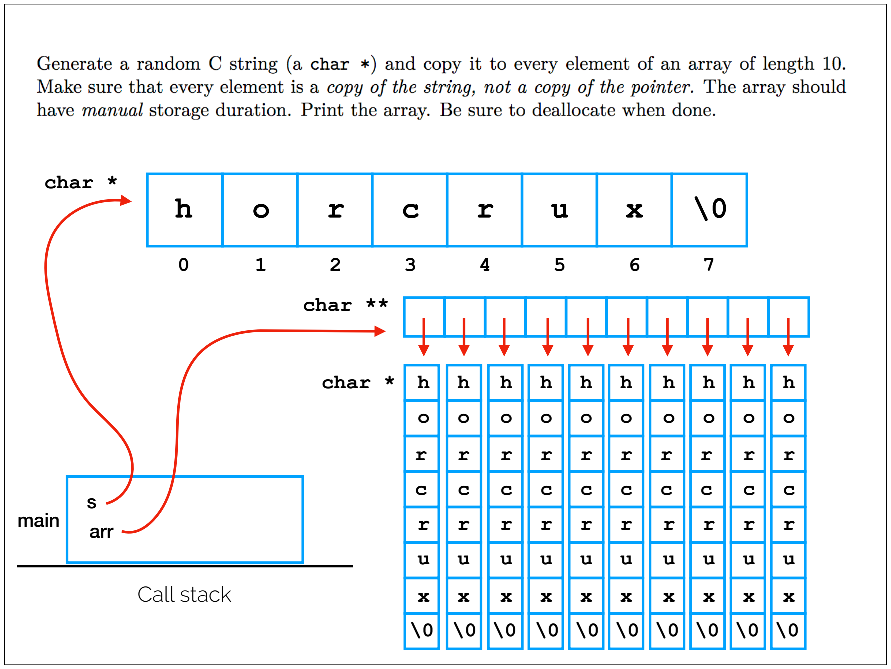

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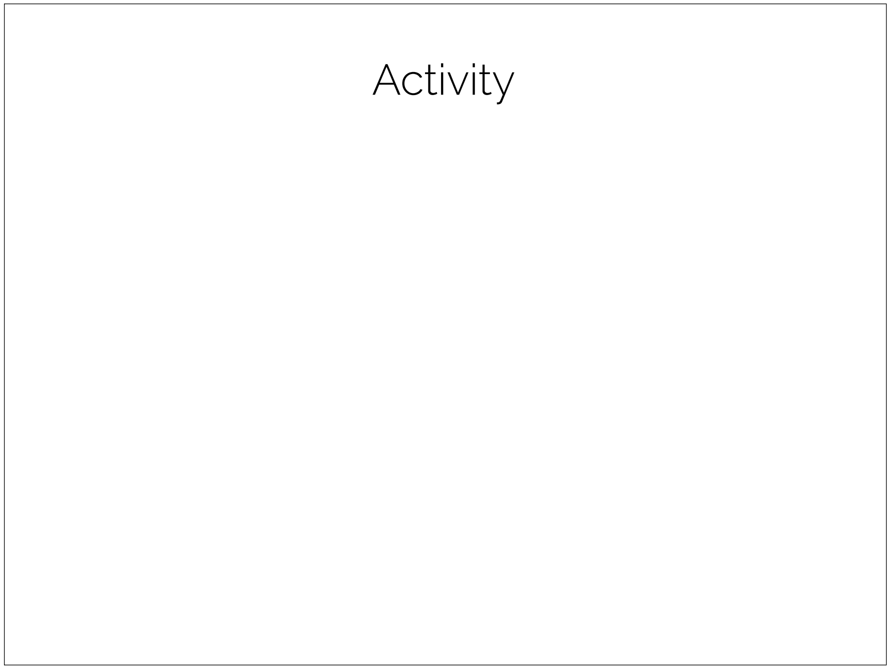
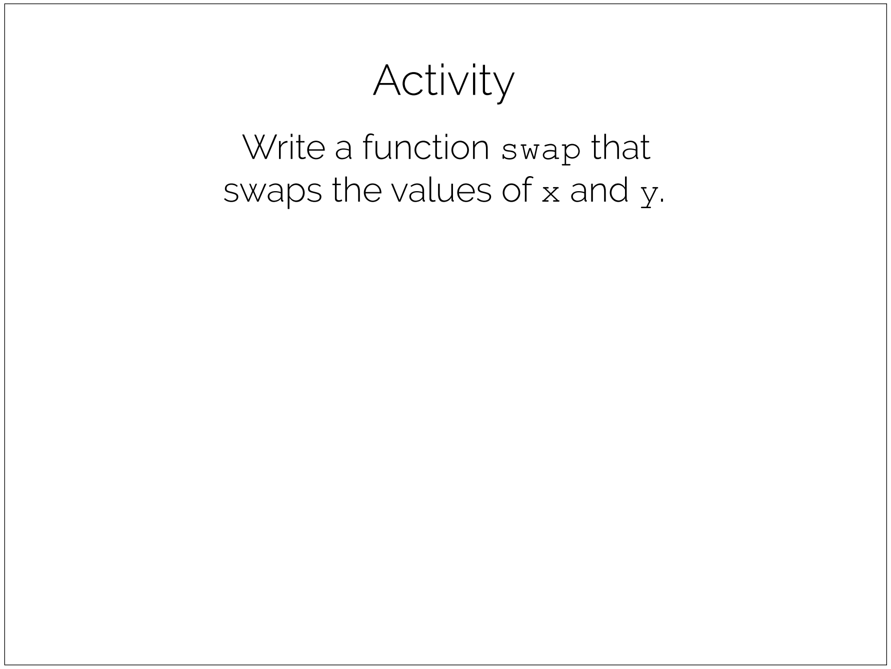


Activity



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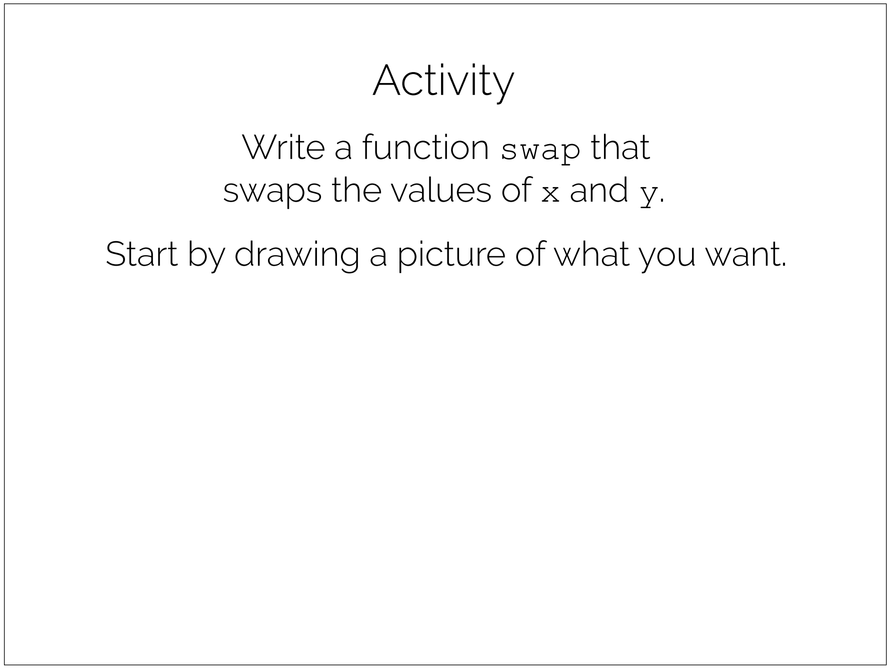
Write a function `swap` that swaps the values of `x` and `y`.



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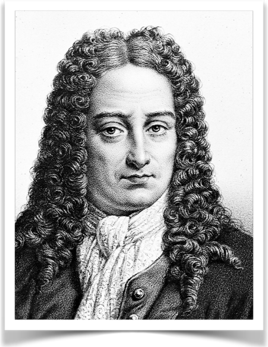
```
#include <stdio.h>

void swap(int *a, int *b) {
  ???
}

int main() {
  int x = 1;
  int y = 2;
  swap(&x, &y);
  printf("x = %d, y = %d\n", x, y);
  return 0;
}
```

The Dream



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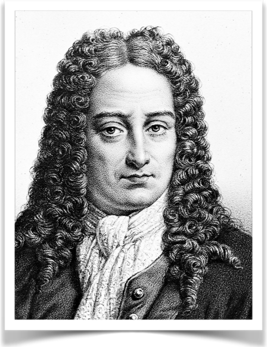
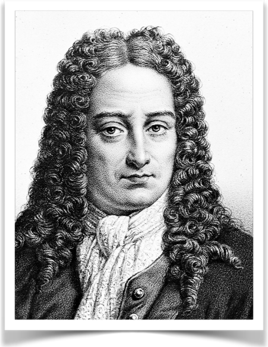


Wilhelm Gottfried Leibniz

The Dream

“I thought again about my early plan of a new language or writing-system of reason, which could serve as a communication tool for all different nations… If we had such an universal tool, we could discuss the problems of the metaphysical or the questions of ethics in the same way as the problems and questions of mathematics or geometry. That was my aim: Every misunderstanding should be nothing more than a miscalculation (…), easily corrected by the grammatical laws of that new language. Thus, in the case of a controversial discussion, two philosophers could sit down at a table and just calculating, like two mathematicians, they could say, 'Let us check it up …'”



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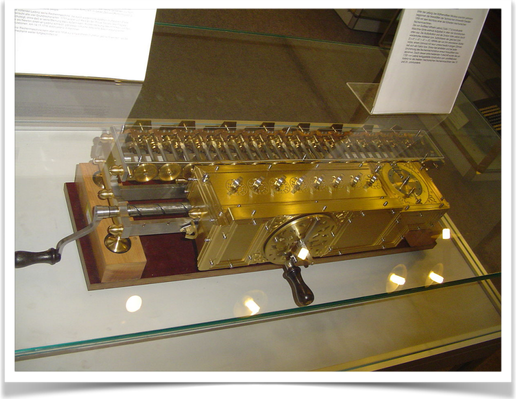

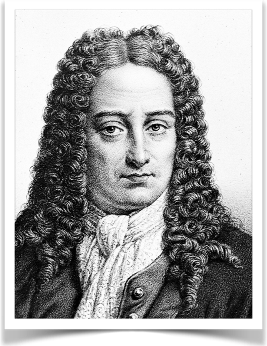

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"What is the answer to the ultimate question of life, the universe, and everything?

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- “Entscheidungsproblem” (literally “decision problem”)
- Leibniz thought so!

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- We care because the computable functions can be done on a computer.

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- By implication: no algorithm can determine whether an arbitrary logical statement is valid.