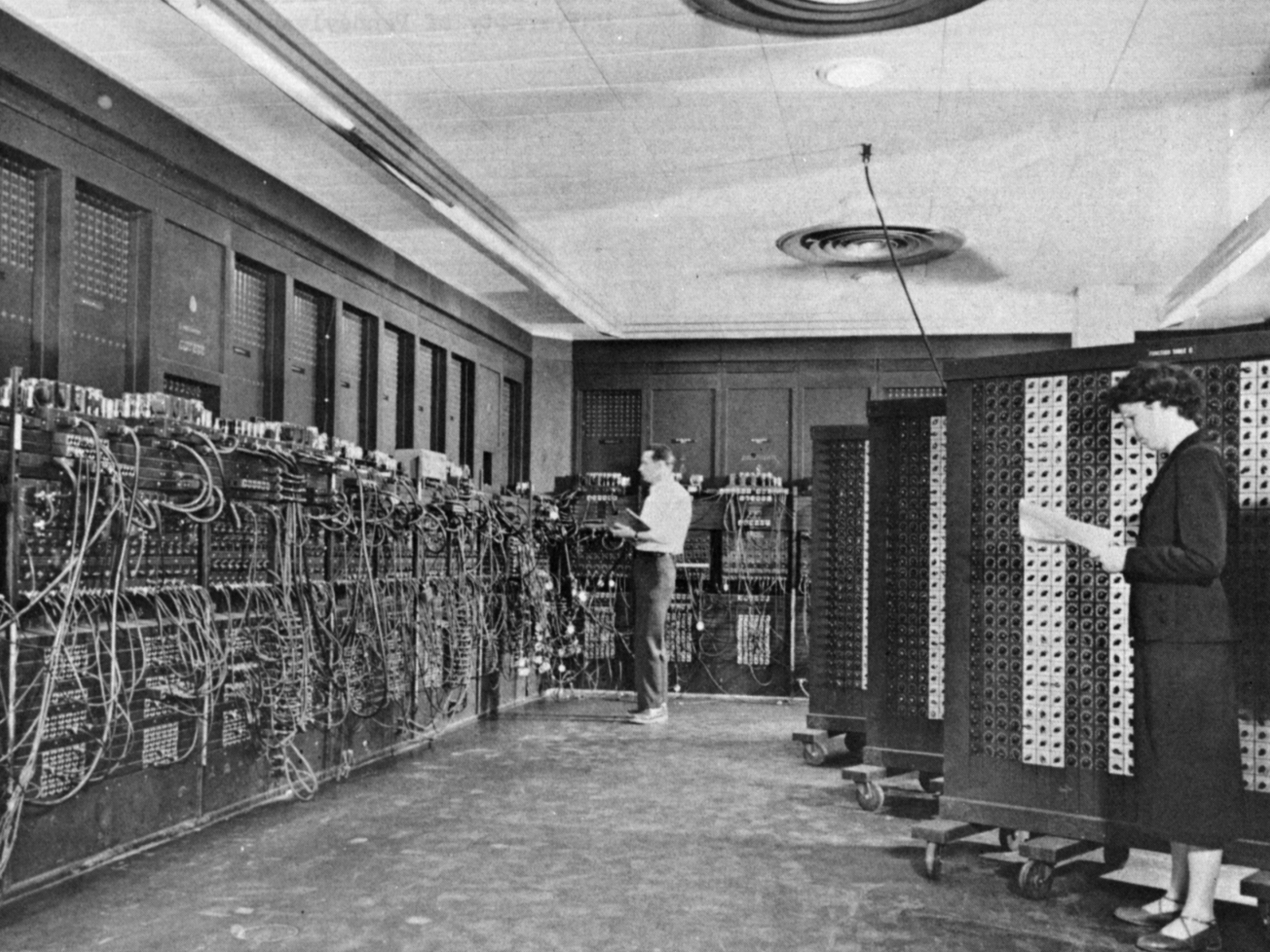
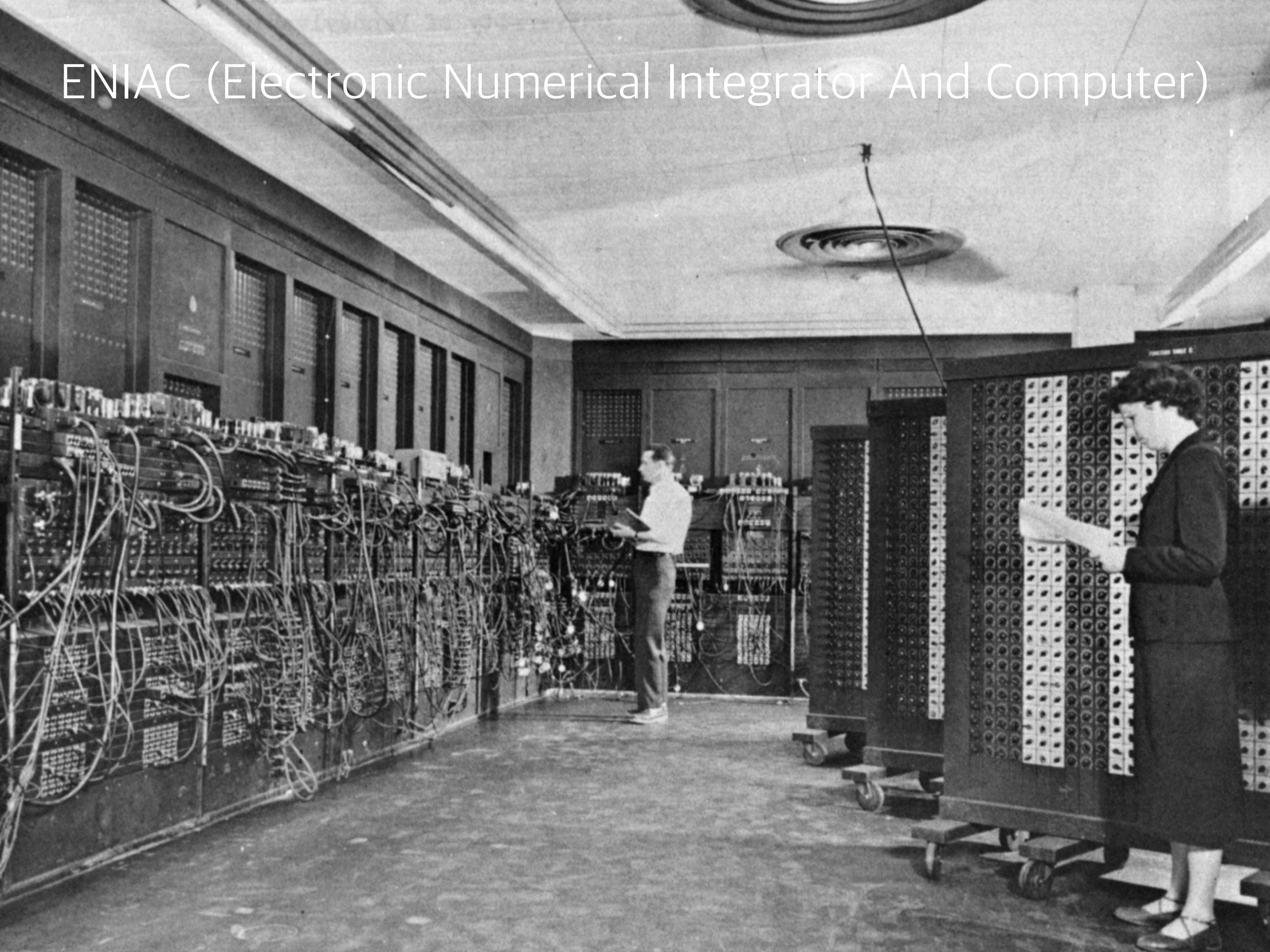
Review

- Automata theory
  - Finite automata
  - Pushdown automata
  - Turing machines
- Computability
  - Computable
  - Incomputable problems



ENIAC (Electronic Numerical Integrator And Computer)



ENIAC (Electronic Numerical Integrator And Computer)

1 x 2.5m x 25m

30t

18,800 vaccum tubes

150kw

$490,000

...

ENIAC (Electronic Numerical Integrator And Computer)

1 x 2.5m x 25m

30t

18,800 vaccum tubes

150kw

$490,000

...

Lots of engineering

ON COMPUTABLE NUMBERS, WITH AN APPLICATION TO THE ENTSCHEIDUNGSPROBLEM

By A. M. TURING.

[Received 28 May, 1936.—Read 12 November, 1936.]

The "computable" numbers may be described briefly as the real numbers whose expressions as a decimal are calculable by finite means. Although the subject of this paper is ostensibly the computable *numbers*, it is almost equally easy to define and investigate computable functions of an integral variable or a real or computable variable, computable predicates, and so forth. The fundamental problems involved are, however, the same in each case, and I have chosen the computable numbers for explicit treatment as involving the least cumbrous technique. I hope shortly to give an account of the relations of the computable numbers, functions, and so forth to one another. This will include a development of the theory of functions of a real variable expressed in terms of computable numbers. According to my definition, a number is computable if its decimal can be written down by a machine.

In §§ 9, 10 I give some arguments with the intention of showing that the computable numbers include all numbers which could naturally be regarded as computable. In particular, I show that certain large classes of numbers are computable. They include, for instance, the real parts of all algebraic numbers, the real parts of the zeros of the Bessel functions, the numbers π, e, etc. The computable numbers do not, however, include all definable numbers, and an example is given of a definable number which is not computable.

Although the class of computable numbers is so great, and in many ways similar to the class of real numbers, it is nevertheless enumerable. In § 8 I examine certain arguments which would seem to prove the contrary. By the correct application of one of these arguments, conclusions are reached which are superficially similar to those of Gödel†. These results

† Gödel, "Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme, I", *Monatshefte Math. Phys.*, 38 (1931), 173–198.

foundations of computing

- what computing is
- what computers can do and cannot do

EDVAC

45.5m^2
6,000 vaccum tubes
150kw
$100,000

5.5KB memory
1~3sec / +x

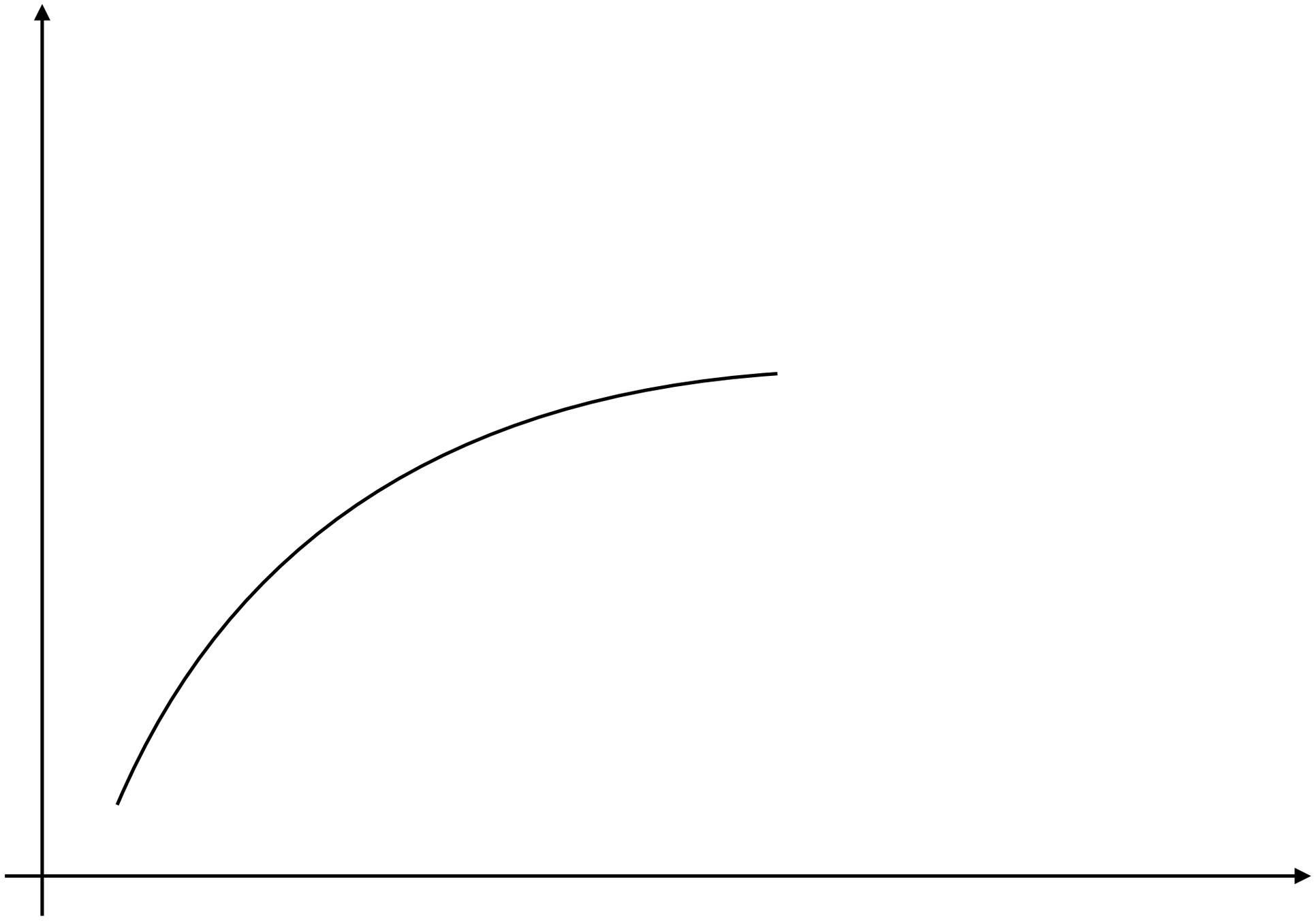
EDVAC

45.5m^2
6,000 vaccum tubes
150kw
$100,000

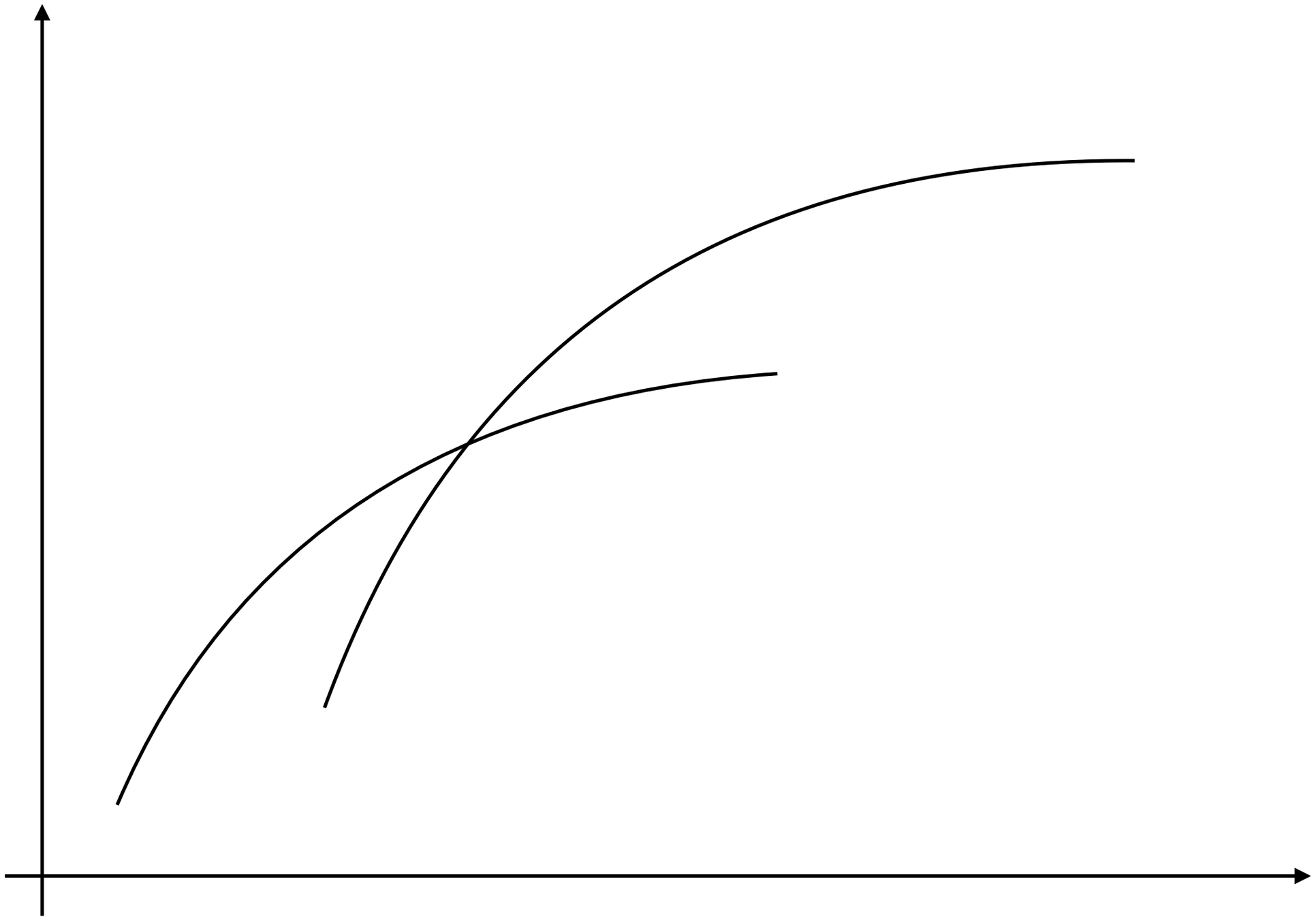
5.5KB memory
1~3sec / +x

first stored program (universal) computer

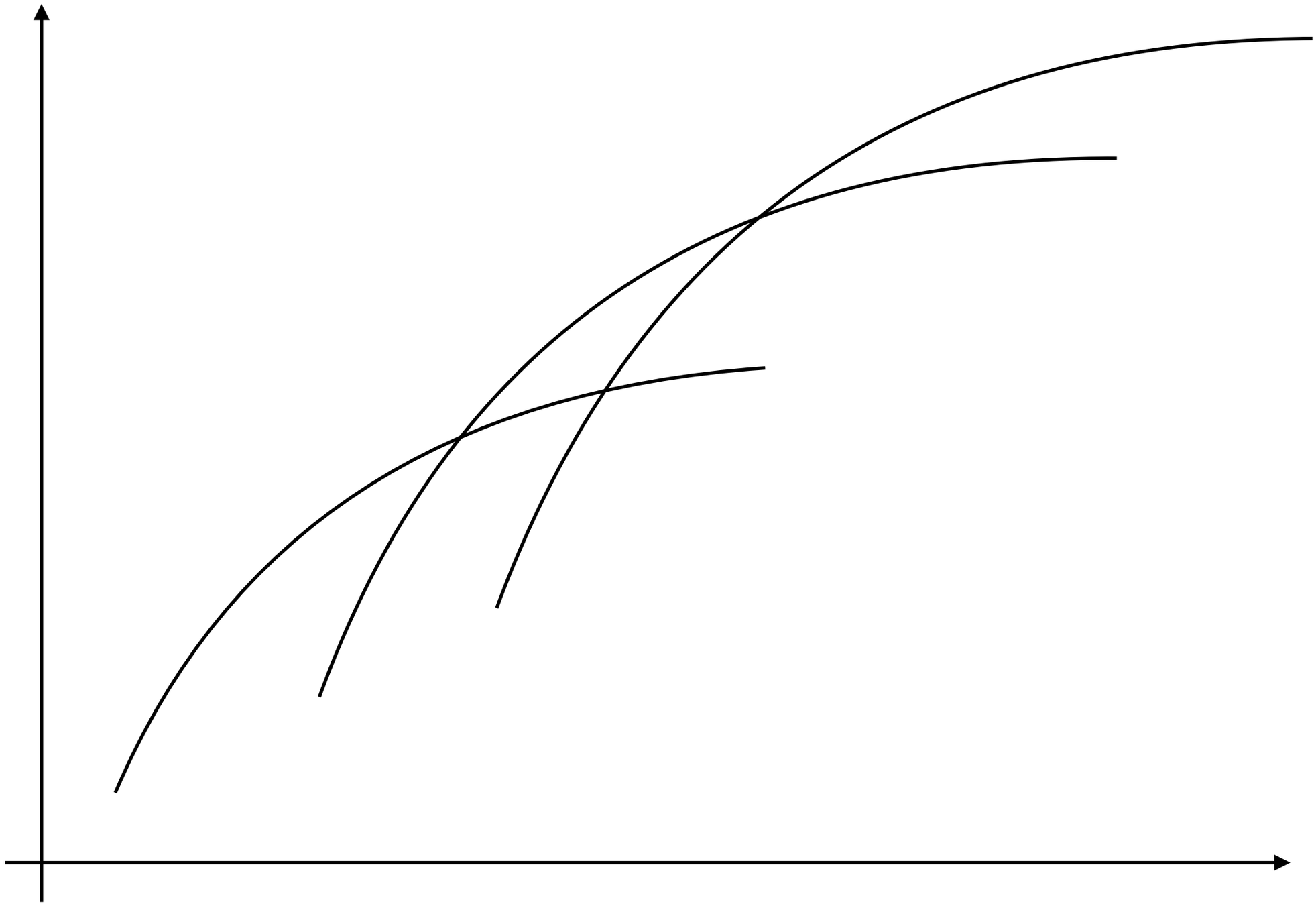
Advances of technologies



Advances of technologies



Advances of technologies



Mathematics & Logics

Algorithm

Language

Mathematics & Logics

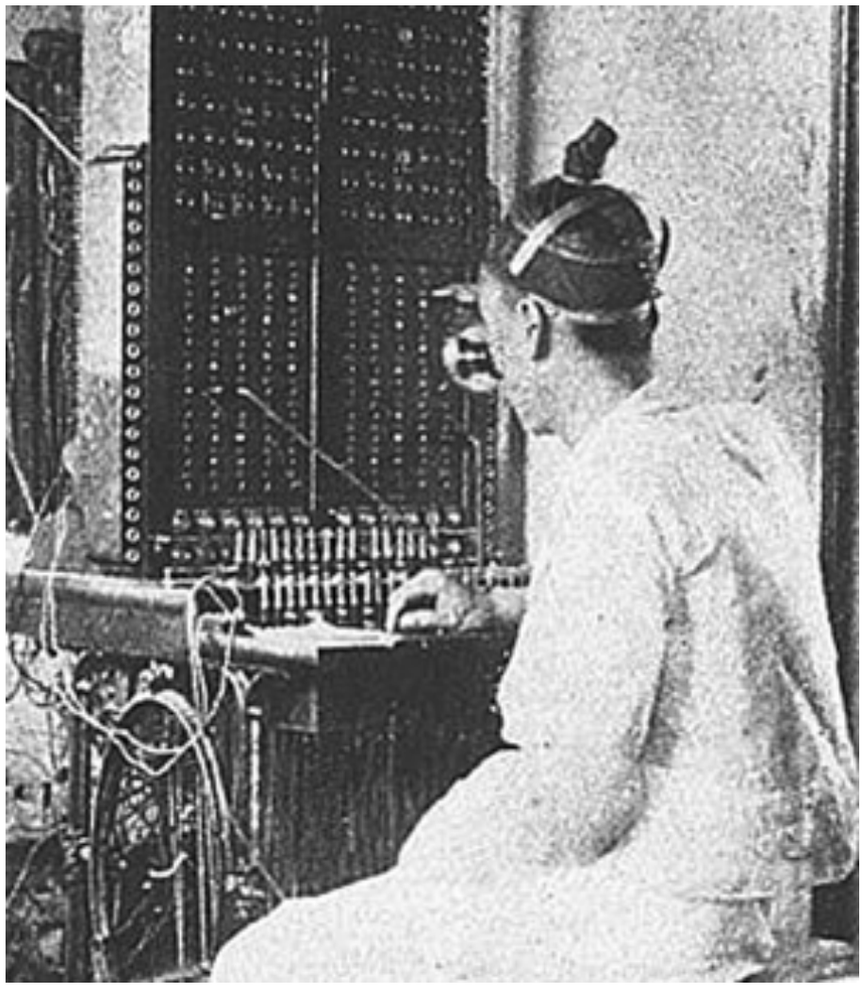
SW techs

Algorithm

Language

Mathematics & Logics

Human vs. Computer




AT&T 3B20D


ALPHAGO
01:59:50
LEE SEDOL
AlphaGo
Lee Sedol

Google 번역

한국어

영어

말하기

한국어

취소


support
convenience
technology
innovation
MOOC
learning
new
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enrolling
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everyone
project
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thought
possibility
reach
people
special
accessible
change
open
knowledge
everyone
goals
hope
social
discussion
participate
digital
experience
simple
complete
education
think
online
attention
challenge
questions

What's unique in Human Intelligence?

Final Exam

- 6/9 (Thr), Rooms 611, 615 in Science Library
  - Check your room on blackboard

- Coverage: pushdown automata ~ undecidability (lec10.pdf ~ lec17.pdf)

한학기 수고 많았습니다!