

Tech for
Everyone
Logo

MODERN COMPUTING
SERIES

ARCHITECTURE
EDITION

Name:

John von Neumann

Date:

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The Brain Behind the Modern Computer

Have you ever used a smartphone to play a game, and then easily switched over to a web browser or a math app? That ability to run different apps on the exact same device is all thanks to a brilliant mathematician named **John von Neumann** (pronounced *von NOY-man*).

Born in Hungary in 1903, John was a child prodigy. By the time he was just six years old, he could divide two giant 8-digit numbers entirely in his head! He also had a photographic memory, meaning he could read a book once and remember every single word on every page for years.

When the very first electronic computers were built, they had a major problem: to make them run a new program, engineers had to spend days unplugging and replugging hundreds of wires by hand! John realized this was much too slow. He wrote a famous paper explaining that a computer's **data** (like numbers and words) and its **instructions** (the software or apps) should be stored together inside the computer's memory.

This brilliant idea is called the **Stored-Program Concept** (or the "von Neumann Architecture"). Because of his idea, you don't have to rebuild your phone with a screwdriver every time you want to play a new game—you simply download the instructions straight into its memory! Besides computing, John also invented a type of math called *Game Theory*, which helps people understand strategy and decision-making in economics and life.

Reading Check

1. What amazing math trick could John do in his head when he was just six years old?

2. Before John von Neumann's idea, how did engineers change a computer's program?

- ☐ By typing a new password on a keyboard.
- ☐ By unplugging and replugging hundreds of wires by hand.
- ☐ By washing the computer with soap and water.

3. What was his brilliant "Stored-Program" idea?

4. What type of math did John invent to help study strategy and decision-making?

The Computer's Brain Match-Up

The **von Neumann Architecture** has three main parts: **Input** (how we give the computer information), the **CPU/Memory** (the brain where the stored program does the work), and **Output** (how the computer gives us answers).

Draw a line to match the real-world computer part to its correct job in the architecture!

1. A Keyboard or Mouse

2. A glowing Computer Monitor

3. A Hard Drive storing a Video
Game

A. Memory (Where the instructions live)

B. Input (Giving the computer data)

C. Output (Showing you the result)

Design a Multi-Purpose Gadget!

Because of the "Stored-Program" concept, one single machine can do many different jobs just by loading different apps. Design a brand-new, futuristic gadget! Draw what it looks like, and then list **three completely different apps** that are stored in its memory.

Draw your futuristic gadget here!

⚙️ ADVANCED HARDWARE ⚙️

App

#1:

App

#2:

App

#3:

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