

Name: _____

Date: _____

Class: _____



TECHSHEETS.DEV

MODERN COMPUTING SERIES

John von Neumann

The Architect of the Modern Computer

Have you ever wondered how your smartphone can play a video game, send a text message, and calculate your math homework all on the exact same device? You can thank a brilliant Hungarian-American mathematician named **John von Neumann**. Born in Budapest in 1903, von Neumann was a child prodigy. By age six, he could divide eight-digit numbers in his head! He grew up to become one of the greatest scientific minds of the 20th century.

Before von Neumann, early computers like the ENIAC were giant machines that filled entire rooms. However, they had a massive flaw: to change the program they were running, engineers had to physically unplug hundreds of cables and flip manual switches. It took days just to set up a single math problem!

In 1945, von Neumann wrote a famous paper describing a much better way to build a computer. He introduced the "**stored-program**" concept. He realized that a computer's instructions (the software program) and its data (the numbers it was calculating) could be stored in the exact same memory space. Because of this, you could instantly switch from one program to another just by loading new instructions into the memory, without ever touching the physical hardware.

His design is called the **von Neumann Architecture**, and it breaks a computer down into three main parts: the Central Processing Unit (the CPU that does the math), the Memory (where data and programs are stored), and Input/Output devices (how humans interact with it). Astonishingly, almost every single computer, laptop, and smartphone built today still uses this exact same architecture that von Neumann designed over 80 years ago!

Part 1: Reading Comprehension

1. Where was John von Neumann born, and what amazing math skill did he have by age six?

2. Before von Neumann's idea, how did engineers have to change the program on early computers like the ENIAC?

3. What is the "stored-program" concept?

4. Name the three main parts of a computer according to the von Neumann Architecture.

Part 2: Critical Thinking

5. Because of von Neumann's stored-program architecture, you can download new "apps" (programs) to your phone without having to buy a new phone. How would your daily life be different if every electronic device you owned could only do ONE specific job, and could never be reprogrammed?

Part 3: The Architecture Matching Challenge

John von Neumann divided computers into specific, logical parts. Today, the smartphone in your pocket uses this exact same layout!

Directions: Look at the parts of a modern smartphone below. Write the correct von Neumann term next to each smartphone part.

Word Bank

Input

Output

Memory / Storage

Central Processing Unit (CPU)

1. The Microchip



This is the "brain" of the phone. It does all the math and follows the instructions of your apps.

2. The Touchscreen Glass



When you tap the glass with your finger, it sends data and instructions INTO the computer.

3. The Flash Drive / RAM



This is where your photos, videos, and downloaded apps are kept safe so the brain can use them later.

4. The Speaker & Screen Display



This is how the phone gives information OUT to you, like playing a song or showing a YouTube video.
