Who was Konrad Zuse? http://zuse.zib.de/

Konrad Zuse (1910-1995) was a computer pioneer who built one of the first program-controlled computing machines. Between 1936 and 1945 he built his first four computing machines - the Z1, Z2, Z3 and Z4. In 1945 he moved to Bavaria where he continued to construct computing machines with his new company. There he also designed one of the first high-level programming languages - the so-called Plankalkül. Learn more about Konrad Zuse and his machines in the Encyclopedia (please see menu above) or read essays about him.

Zuse's Plankalkül

https://www.britannica.com/technology/computer/History-of-computing#ref723715

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Konrad Zuse developed the first real programming language, Plankalkül ("Plan Calculus"), in 1944–45. Zuse's language allowed for the creation of procedures (also called routines or subroutines; stored chunks of code that could be invoked repeatedly to perform routine operations such as taking a square root) and structured data (such as a record in a database, with a mixture of alphabetic and numeric data representing, for instance, name, address, and birth date). In addition, it provided conditional statements that could modify program execution, as well as repeat, or loop, statements that would cause a marked block of statements or a subroutine to be repeated a specified number of times or for as long as some condition held.

Zuse knew that computers could do more than arithmetic, but he was aware of the propensity of anyone introduced to them to view them as nothing more than calculators. So he took pains to demonstrate nonnumeric solutions with Plankalkül. He wrote programs to check the syntactical correctness of Boolean expressions (an application in logic and text handling) and even to check chess moves.

Unlike flowcharts, Zuse's program was no intermediate language intended for pencil-and-paper translation by mathematicians. It was deliberately intended for machine translation, and Zuse did some work toward implementing a translator for Plankalkül. He did not get very far, however; he had to disassemble his machine near the end of the war and was not able to put it back together and work on it for several years. Unfortunately, his language and his work, which were roughly a dozen years ahead of their time, were not generally known outside Germany.

Plankalkül—the world's first complete high-level language

http://history-computer.com/ModernComputer/Software/Plankalkul.html

The world's first complete high-level language was designed in 1940s (probably between 1941 and 1945, but the concept first published in 1948), by the german computer pioneer Konrad Zuse, the creator of the first relay computer.

From 1941-1946 (at the same time he developed his Z4 computer), Konrad Zuse developed ideas as to how his machines could be programmed in a very powerful way. The language *Plankalkül* was initially described in Zuse's planned Ph.D. dissertation in 1943, later developed in his 1945 (also unpublished, it was still wartime) work "Plankalkül. Theorie del angewandten Logistik.", and finally reached the public in a 1948 article (but still did not attract much feedback and for a long time to come programming a computer would only be thought of as programming with machine code). Plankalkül was eventually more comprehensively published in a 1972 paper, while the first compiler for it was implemented as late as in 1998.

Using the modern programming terminology, the Plankalkül is a typed high-level imperative programming language with following main features:
1. Programs are reusable functions, and functions are not recursive
2. Variables are local to functions (programs)
3. The fundamental data types are arrays and tuples of arrays, but there are also floating point, fixed point, complex numbers; records; hierarchical data structures; list of pairs.
4. The type of the variables does not need to be declared in a special header
5. There is no GOTO construct
6. Assignment operation (e.g.: V1 + V2 => R1).
7. Conditional statement (e.g.: V1 = V2 => R1. This means: Compare the variables V1 and V2: If they are identical then assign the value *true* to R1, otherwise assign the value *false*. Such operations could also be applied on complicated data structures.)
8. Possibility for defining sub-programs.
9. Possibility for defining repetition of statements (loops), WHILE construct for iteration.
10. Logical operations (predicate logic and Boolean algebra).
11. Arithmetic exception handling.

Zuse computer

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- Michael R. Swaine

Zuse computer, any of a series of computers designed and built in Germany during the 1930s and ’40s by the German engineer Konrad Zuse. He had been thinking about designing a better calculating machine, but he was advised by a calculator manufacturer in 1937 that the field was a dead end and that every computing problem had already been solved. Zuse had something else in mind, though.
For one thing, Zuse worked in binary from the beginning. All of his prototype machines, built in 1936, used binary representation in order to

simplify construction. This had the added advantage of making the connection with logic clearer, and Zuse worked out the details of how the operations of logic (e.g., AND, OR, and NOT) could be mapped onto the design of the computer's circuits. (English mathematician George Boole had shown the connection between logic and mathematics in the mid-19th century, developing an algebra of logic now known as Boolean algebra.) Zuse also spent more time than his predecessors and contemporaries developing software for his computer, the language in which it was to be programmed. Although all his early prewar machines were really calculators—not computers—his Z3, completed in December 1941 (and destroyed on April 6, 1945, during an Allied air raid on Berlin), was the first program-controlled processor.

Because all Zuse's work was done in relative isolation, he knew little about work on computers in the United States and England, and, when the war began, his isolation became complete.

Zuse began construction of the Z4 in 1943 with funding from the German Air Ministry. Like his Z3, the Z4 used electromechanical relays, in part because of the difficulty in acquiring the roughly 2,000 necessary vacuum tubes in wartime Germany. The Z4 was evacuated from Berlin in early 1945, and it eventually wound up in Hinterstein, a small village in the Bavarian Alps, where it remained until Zuse brought it to the Federal Technical Institute in Zürich, Switz., for refurbishing in 1950. Although unable to continue with hardware development, Zuse made a number of advances in software design.
Zuse's use of floating-point representation for numbers—the significant digits, known as the mantissa, are stored separately from a pointer to the decimal point, known as the exponent, allowing a very large range of numbers to be handled—was far ahead of its time. In addition, Zuse developed a rich set of instructions, handled infinite values correctly, and included a "no-op"—that is, an instruction that did nothing. Only significant experience in programming would show the need for something so apparently useless.

The Z4's program was punched on used movie film and was separate from the mechanical memory for data (in other words, there was no stored program). The machine was relatively reliable (it normally ran all night unattended), but it had no decision-making ability. Addition took 0.5 to 1.25 seconds, multiplication 3.5 seconds.

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for the creation of procedures (also called routines or subroutines; stored chunks of code that could be invoked repeatedly to perform routine operations such as taking a square root) and structured data (such as a record in a database, with a mixture of alphabetic and numeric data representing, for instance, name, address, and birth date). In addition, it provided conditional statements that could modify program execution, as well as repeat, or loop, statements that would cause a marked block of statements or a subroutine to be repeated a specified number of times or for as long as some condition held.

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Plankalkül is the world's first programming language for computers, written in 1942

By **vijay** - February 6, 2017

Believe it or not, Plankalkül the world's first programming language for computers was written in 1942

Today we live, breathe, and die computers. Our day usually begins with checking our smartphones to switching on our laptops. When we reach the office, we switch on the desktop to start the days work. All these gadgets are powered by an operating system written in various programming languages like C++, Java, Python etc. Even as we read this article, newer languages like Google's Go and Apple's Swift are slowly gaining popularity.

In this world of C, C++, Java, Ruby on Rails etc. which was the first programming language ever written? This is a very difficult question to answer. History of programming languages starts with Ada Lovelace (1840) who is widely regarded as the first programmer. The "set of symbols" she developed is considered the first programming language by many purists. However, another school of thought considers Alan Turing' to be the world's first programmer cite the descriptions Of Turing machine (1936). To back up their claims, they cite various programs and mathematical simulation written by Turing.

World's first programming language

It can't be conclusively said but a programming language known as **Plankalkül seems to be the first programming language ever written for computers.** Taking the high-level non-von Neumann languages for a computer as a basis, Plankalkül, pronounced "Plan Calculus", is widely considered the first programming language (Source: Wikipedia, StackExchange). Plankalkül was created by a German engineer Konrad Zuse for engineering purposes between 1942 and 1945. The literal meaning of Plankalkül is "formal system (*kalkül*) for planning (*plan*)".

Plankalkül was created by Zuse somewhere between 1942 and 1945. However, it failed to gain any attention in the world which was busy with fighting wars (WWII) and died a natural dead. It is believed that Fortran and Lisp take off from where Plankalkül left off. Also, notes about how Zuse worked on developing Plankalkül in 1941, with scribblings survive to this date. Another reason why Plankalkül failed to make any headlines was that Zuse himself become busy with this his efforts to commercialise the Z3 computer and its successors. In 1944 Zuse met with the German logician and philosopher Heinrich Scholz and they discussed Zuse's Plankalkül. In March 1945 Scholz personally expressed his deep appreciation for Zuse's utilization of the logical calculus.By 1946, Zuse had written a book on the subject but this remained unpublished. In 1948 Zuse published a paper about the Plankalkül in the "Archiv der Mathematik" but still did not attract much feedback –

for a long time to come programming a computer would only be thought of as programming with machine code.

Here’s how Hello world! would be written in Plankalkül, the world’s first programming language for computers:

```
R1.1(V0[:SIG]) => R0
R1.2(V0[:M X SIG]) => R0
0 => I | M + 1 => J
[W [ I < J -> [ R1.1(V0[I: M X SIG]) => R0 |
I + 1 => I ] ] ] END
R1.3() => R0
‘H’;’E’;’L’;’L’;’O’;’,’;’ ‘;’W’;’O’;’R’;’L’;’D’;’!’
=> Z0[: M X SIG] R1.2(Z0) => R0
END
```

While in 1945, Plankalkü failed to gain any attention, it was comprehensively published and implemented in a dissertation in late 1972. Later in 1998 and 2000, there were instances of other independent implementations.