October 10, 2018 Meeting

The October 10, 2018 Waterloo Technical Society (WTS) meeting was called to order by President Dorhout at 7:20 pm. President Dorhout welcomed visitors and noted that this was the second meeting of the 105th year of the Society.

A total of 29 members and guests attended.

Treasurer's Report. Ken Friend reported a beginning balance of $355.17. Income of $500.00 from memberships with expenses of $120.00 for the six September speakers' meals, no other expenses leaving a new balance of $735.17. Treasurer Friend's report stated a total of 8 honorary and 25 paid members yielding a membership roster of 33 members.

Current Officers. Officers for the 105th WTS year were introduced by President Dorhout:

Officers for the 2018-2019 year (year 105) are:

President:	Gary Dorhout
Co-Vice Presidents:	Jerry Mohling and James Stevenson
Treasurer:	Kenneth Friend & Paul Anderson
Dinner Reservations:	Derek Eagles & Steve Lang
Secretary:	James Stevenson
Publicity/Recognition:	Todd Whiting
Auditing:	Bill Mitchell & Jim Garrett
Nominating Committee:	Open
Web Site:	Tim Schoenfelder / Jim Volgarino

Old Business. President Dorhout reviewed the topics for this year. The dates, speaker and topics for the 105th WTS were:

Speakers for the 2018-2019 Meeting Year (Year 105)

12 Sep 2018—Austin Maginnis—Tiny House Project at UNI
Oct 10 – Steve Lang – Early Electronic Digital Computers
Nov 14 – Jim Volgarino – History of Tunis Speedway
Jan 9, 2019 – Chuck Nielson – Airgas Gas Supply
Feb 13 – Open – **looking for speaker**
Mar 13 – Vasko Popovski – Advanced Heat Treat (Mike Woods)
Apr 10 – Open – **looking for speaker**
May 8 – AECOM Engineering Services, Waterloo, IA
(Architecture, Engineering, Construction and Operations Management)

Discussion on the May 2018 motion to donate $250 to Tiny House Program at UNI concluded with a decision to identify where donations have been made and prioritize alternatives for donations for action at the November 14, 2018 meeting. President Dorhout and Treasurer Friend to make a list and members to identify possible recipients. Item tabled until the November 2018 meeting.

President Dorhout asked members to identify wishes or needs for our Website Design and pass to Jim Volgarino. the $100 given by Todd Whiting would be applied to Website Design to provide a way to attract members, request reservations and distribute information.

New Business. No new business was discussed.

Guest Speaker. **Steve Lang**, retired John Deere Product Engineer and WTS Sargeant-at-Arms

Steve Lang retired from John Deere after working 34 years at the Product Engineering Center in Cedar Falls. During that time Steve worked on designing tractor dashboard instruments and more recently, wireless machine communication systems. Steve received a Bachelor of Science Degree in Electrical and Computer Engineering from the University of Wisconsin Madison and a Masters of Business Administration from the University of Northern Iowa.

Steve will shared his interest in vintage computers and presented a brief history of the early electronic digital computers (employing relays, vacuum tubes, and discrete transistors), including descriptions of the Colossus, Mark 1, ENIAC, SSEM, and several others. This presentation included Electro-Mechanical Computers.

Background: Who is credited for invention of the digital computer?

In 1822, Charles Babbage conceptualized and began developing the **Difference Engine**, considered to be the first automatic computing machine. But the "modern" computer had its origins in the late 1930s.

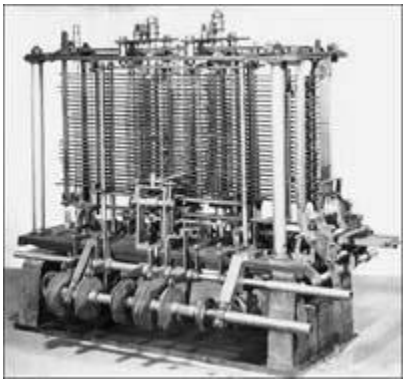


Figure 1. Babbage difference machine.

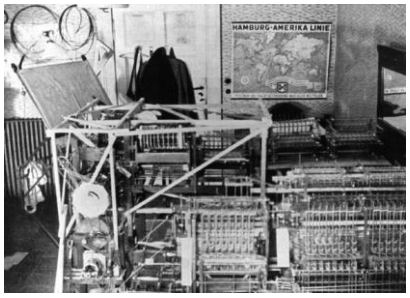


Figure 2. Zuse Z1 machine.

The **Z1** was created by German Konrad Zuse in his parents' living room between 1936 and 1938. It is considered to be the first electro-mechanical binary programmable computer, and the first really functional modern computer.

The **Turing machine** was first proposed by Alan Turing in 1936 and became the foundation for theories about computing and computers. The machine was a device that printed symbols on paper tape in a manner that emulated a person following a series of logical instructions.

The first Digital Computer. Short for Atanasoff-Berry Computer, the **ABC** began development by Professor John Vincent Atanasoff and graduate student Cliff Berry in 1937. Its development continued until 1942 at the Iowa State College (now Iowa State University).

The ABC was an electrical computer that used more than 300 vacuum tubes for digital computation, including binary math and Boolean logic and had no CPU (was not programmable). On October 19, 1973, the US Federal Judge Earl R. Larson signed his decision that the ENIAC patent by J. Presper Eckert and John Mauchly was invalid and named Atanasoff the inventor of the electronic digital computer.

The first electric programmable computer. The **Colossus** was the first electric programmable computer, developed by Tommy Flowers, and first demonstrated in December 1943. The Colossus was created to help the British code breakers read encrypted German messages.

The **ENIAC**, Electronic Numerical Integrator and Calculator, was invented by J. Presper Eckert and John Mauchly at the University of Pennsylvania and began construction in 1943 and was not completed until 1946. At a cost of $500,000, it occupied about 1,800 square feet and used about 18,000 vacuum tubes, weighing almost 50 tons. It took 200 KW to power the machine. Many still consider the ENIAC to be the first digital computer because it was fully functional.

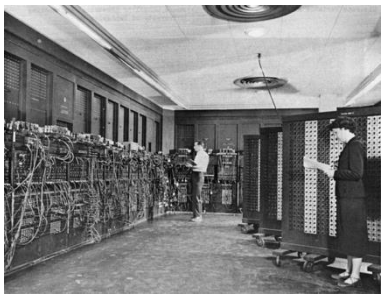


Figure 3. ENIAC computer.

In 1944, Harvard **Mark I** was produced for use by IBM and the U.S. Navy. This computer used punched paper tape to store programs. Grace Hopper was the first programmer. Her methods eventually led to creation of COBOL programming language. At 3:45 p.m., Grace Murray Hopper recorded 'the first computer bug' in the Harvard **Mark II** computer's log book. The problem was traced to a moth stuck between relay contacts in the computer, which Hopper duly taped into the Mark II's log book with the explanation: “First actual case of bug being found.” The bug was actually found by others but Hopper made the logbook entry.

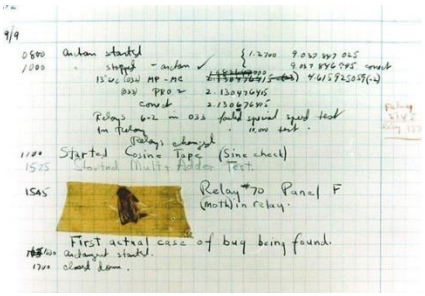


Figure 4. First computer bug.

The early British computer known as the **SSEM** is considered to be the first stored program electronic computer. The computer no longer required re-wiring to run programs.

The **Whirlwind I** computer was a machine dedicated to flight simulation. It was the first computer to use parallel rather than sequential instruction processing. There were 5,000 vacuum tubes in the computer and it weighed 20,000 pounds. The computer utilized a Williams tube for memory. The device operated by writing a grid of dots and dashes (later dim and bright dots) to the CRT which were sensed by the collector plate that flips up directly over the CRT. Any binary word in the display could immediately be read, instead of having to be sequentially accessed.

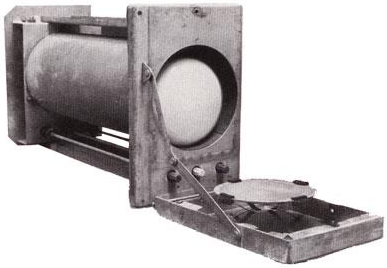


Figure 5. Williams tube. First random access storage device.

By 1953 magnetic core memory became available and replaced the Willliams tube.

First delivered to the United States government for the Census of 1950, the **UNIVAC 1101** or **ERA 1101** is considered to be the first computer that was capable of storing and running a program from memory.



Figure 6. Bendix G-15.

In 1956 the **Bendix G-15** computer was introduced. It was a tower machine similar to towers for home computers in the last decade and utilized a high-speed tape reader for programming. The Bendix Company was sold to Control Data in 1963.

The **LGP-30** is commonly referred to as a desk computer. Obviously, this phrase originated because the size of the LGP-30 closely parallels the size of a standard office desk. The LGP-30 was 26" deep, 33" high, and 44" long, exclusive of the typewriter shelf. The computer weighed approximately 800 pounds and is mounted on sturdy casters which facilitate movement of the computer. The front panel lights replaced the oscilloscopes so the operator could see three registers' contents as programs executed. The machine was a 4096 memory using a 31 bit word on a drum. The machine used 500 Watts of power which required a warm up and cool down cycle to use.

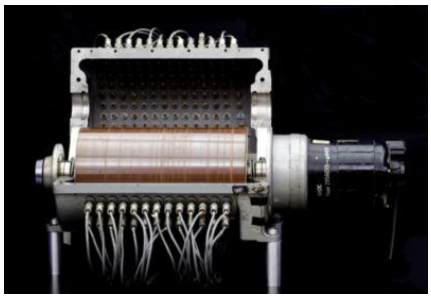


Figure 7. Magnetic drum.

RCA introduced the **RCA 501** in 1958. This was first to use solid state circuits in place of vacuum tubes. The U.S. Army and Navy and Allstate Insurance were some of the early customers.

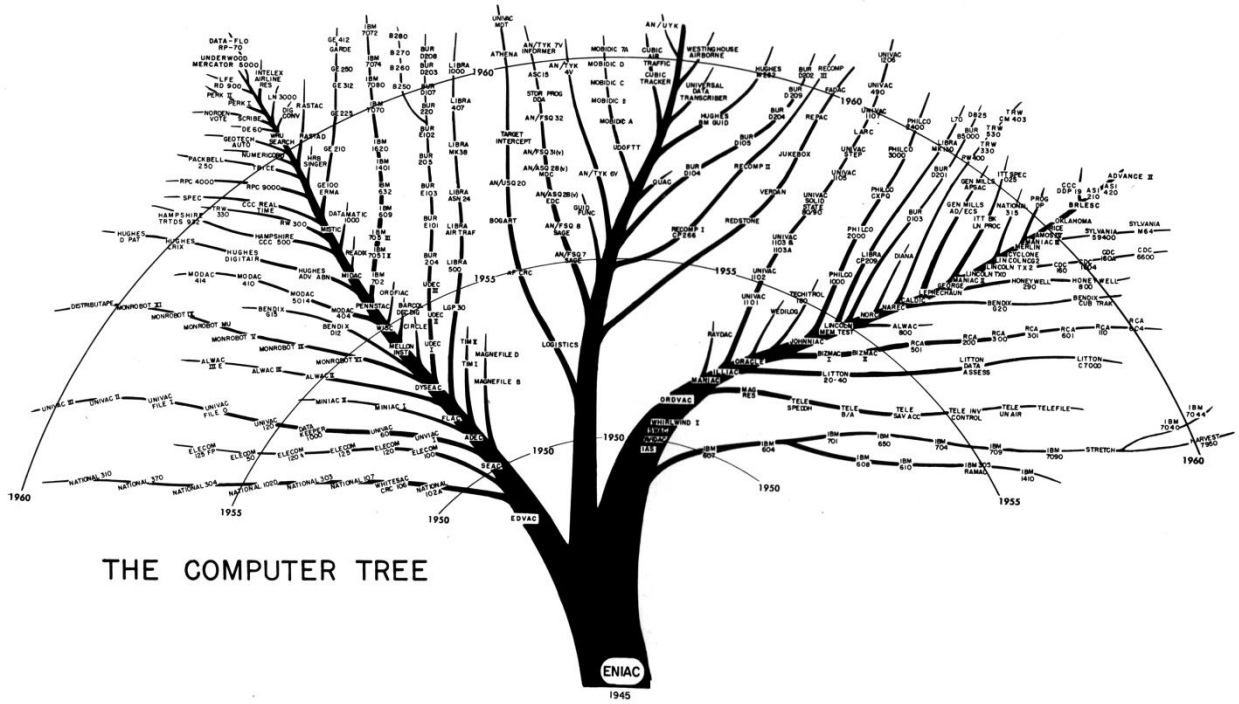
Control Data introduced the **CDC 160-A** in 1960. This machine had 4096 memory using a 48 bit word. 400 circuit cards were used to perform computations. The screen had octal numerals on a translucent screen to show register status to the operator. It was the size of a desk but used 110 Volt power.



Figure 8. CDC 160-A

Later, 1960s, Control Data introduced the **CDC 1604** which had 32K memory using a 48 bit word. It was the fastest computer at that time. The 1604 was CDC's first computer, primarily designed by engineer **Seymour Cray**, who would later go on to found Cray Research and be called the "father of the supercomputer".

This computer tree has three major trunks: Business, Military and Scientific. These trunks are the major uses of



computers and their develment targets since the 1930s. The arcs indicate the time of appearance. Note the many branches at the top which indicates the growing diversity of application of the digital electronic computer.

John Heckman offered a **Timex-Sinclair 1000** pristine computer to anyone interested. The proceeds to be donated to WTS.



Figure 9. Timex-Sinclair computer with manuals from J. Heckman.

Next Meeting. The next meeting will be November 8, 2018, Jim Volgarino with speak about the Tunis Speedway History.

Meeting adjourned at 8:45 pm.

Respectfully submitted,

James R. Stevenson, Vice President and Secretary