June 21st

The Flip-flop

June 21, 1918

William Henry Eccles and Frank Wilfred Jordan from London's City and Guilds Technical College filed a patent for "Improvements in Ionic Relays," which was granted in 1920.

The device was originally called the Eccles–Jordan trigger circuit, or bistable multivibrator, but the much catchier name, flip-flop, soon caught on, probably because of the sound emitted on a speaker during the transition between its two states. It was this ability to switch smoothly between states that made it such an ideal choice for building digital circuits. It was first employed in the computing domain for the Colossus [Jan 18; June 1] in 1944.

Manchester Baby

June 21, 1948

The Small-Scale Experimental Machine (SSEM or Manchester Baby) took 52 minutes to run its first program.

A replica of the Manchester Baby on display at the Museum of Science and Industry in Manchester. Photo by KGGucwa. CC BY-SA 3.0.

The 17-instruction sequence, written by Tom Kilburn [Aug 11], found the highest factor of 2^{18}, by testing every integer from $2^{18} - 1$ downwards. The necessary divisions were done by repeated subtractions since the Baby had that operation implemented in hardware.

The test started at 11.15am, and terminated after performing 3.5 million operations reliably. Legend has it, quite unfairly, that this was the only program Kilburn ever wrote.

Geoff Tootill wrote a revised version the following month (which still exists), and in mid-July Alan Turing [June 23] submitted a third program that utilized a long division routine. The Baby was deemed fully operational in Oct. 1949.

The machine had been developed over the previous two years by Freddie Williams [June 26], Kilburn, and Toothil. It had 550 valves, could execute 700 instructions per second, and had 32 words of 32-bit memory.

As such, it was the first machine to implement von Neumann's stored program concept [June 30]. Indeed, Baby was primarily constructed to test the Williams-Kilburn tube [Dec 11], the first electronic random access memory. Other computer projects, such as the EDSAC [May 6], had stuck with mercury delay lines even though they were bulky, expensive, awkward to set up, and relatively slow.

There's been plenty of heated debate over which machine was the first to implement von Neumann's concept. Baby was an experimental machine, and so some historians claim that the BINAC ([April 4], 1949) or EDSAC were the first "real" stored program computer.

On 21 June 2022, the Baby was recognised by the IEEE as the first electronic computer with a random access read/write memory by their award of an IEEE Milestone. A plaque recording this award is mounted on the wall of the old Electrotechnics building in Coupland Street beneath the windows of the room in which the computer was located.

Turing's role in the project was nominally as the head of the lab, but according to Maurice Wilkes [June 26], "Freddie Williams took good care that Turing did not meddle in the engineering design of the machine that he and Tom Kilburn were building."

Baby's success prompted the development of the much more powerful Manchester Mark I [June 16], and the Ferranti Mark I [Feb 12], the first general purpose commercial computer.

Timothy William Bray

Born: June 21, 1955;

Vancouver, Canada

Bray was one of the co-authors of the XML specification [Feb 10] at the World Wide Web Consortium at the end of the 1990's.

He had become the manager of the New Oxford English Dictionary (OED) project at the University of Waterloo in 1987, and worked with SGML, which would later become central to XML's standardization.

Halfway through the XML specification process, Bray accepted some consulting work from Netscape [March 25], provoking protests from Microsoft. The dispute was eventually solved by the appointment of Microsoft's Jean Paoli as another co-editor.

Although Bray worked for Google [Aug 19] for several years, he left in March 2014 as he was unwilling to relocate to Silicon Valley from Vancouver. Bray said his heart was in Vancouver and found the Bay Area "congested, racist, incestuous, and overpriced."

MITRE Corp.

July 21, 1958

Mitre was formed in 1958 to provide an overall direction to the companies involved in the SAGE project [June 26]. Most of

MITRE's early employees transferred from MIT's Lincoln Lab [Dec 15] where SAGE was being developed.

After SAGE was fully deployed in 1963, the Federal Aviation Administration (FAA), selected Mitre to develop a similar system for automated air traffic control. Unbelievably, the National Airspace System (NAS) is still in use, although the FAA has been working on a replacement called NextGen for the last 15 years. It moves away from ground-based air traffic control to a satellite-based system.

There are around 41,000 NAS operational facilities in the US, utilizing over 71,000 pieces of equipment, ranging from radar systems to communication relay stations. On average, about 50,000 flights use NAS services each day.

WATFOR

Summer 1965

Four math students from the University of Waterloo – Gus German, James G. Mitchell, Richard Shirley and Robert Zarnke, led by Peter Shantz, developed a Fortran compiler for the IBM 7040 [Nov 30] called WATFOR (WATerloo FORtran).

It was fast, with good error diagnostics, and proved popular with students. The compiler allowed the 7040 to execute 6,000 jobs an hour, reducing the cost of running a program from $10 to 10c.

WATFOR was soon ported to other machines, and the textbook "Fortran IV with WATFOR and WATFIV" (1970) influenced a generation of computer science students.

WATFOR's upgrade WATFIV was pronounced as "WHAT FIVE". An alternative articulation was "WHAT FOUR", as in WAT-F-IV.

Four Colors Suffice

June 21, 1976

In 1852, Francis Guthrie noted with some surprise that he only needed four colors to fill in a map of English counties. He wondered whether it was true of any map.

In 1976, Kenneth Appel and Wolfgang Haken announced that they were able to show that if no more than four colors were needed for 1,936 basic cases, then more than four would never be needed.

They completed the proof using a program that eliminated cases (taking over a 1,000 hours to do so), making it the first major theorem proved using a computer. Other mathematicians were skeptical at first, but the proof was later independently verified.

To commenorate the event, Appel and Haken's math department at the University of Illinois issued a postmark with the words, "Four colors suffice."

Neil Robertson, Daniel P. Sanders, Paul Seymour, and Robin Thomas created a quadratic-time algorithm in 1996 that improved on the quartic-time exhibited by Appel and Haken's proof. It also only required the checking of 633 cases.

In 2005, Benjamin Werner and Georges Gonthier formalized a proof of the theorem inside the Coq proof assistant [May 1].

TI-99/4

June 21, 1979

Texas Instruments (TI) announced the TI-99/4 at CES [June 24], making it the first home computer to use a 16-bit microprocessor, the TMS9900 [June 00].

However, the device didn't meet US radio frequency regulations, so was only released in any quantity in early 1980. It also suffered from a disappointing "chicklet-like" keyboard, slow BASIC, and a high price.

TI launched the TI-99/4A in 1982 which could be connected to a standard color TV set, and had a better keyboard. However, if all the possible expansion units were attached at once, they would stretch out many feet to the side.

A TI-99/4A with all its expansion units. Photo by Ron Reuter (aka MainByte).

The TI-99/4A was a commercial flop, mainly because it lost a price war with Commodore's VIC-20 [May 00]. After suffering deficits of over $100 million in 1983, TI discontinued the machine.

AS/400

June 21, 1988

IBM announced a new midrange mainframe, the AS/400, with more than 1,000 packages ready to run, making it the biggest simultaneous software announcement in history.

The AS/400 quickly became one of the world's most popular business systems. By 1997, IBM had shipped nearly a half-million units, and the 400,000th AS/400 was specially presented to Greg LeMond, the three-time winner of the Tour de France bicycle race, on Oct. 9, 1996.

The OS for the AS/400 was originally called OS/400, following the pattern begun with OS/360 [March 31]. Everything was an object (with built-in persistence and garbage collection), unlike the more

traditional UNIX-like approach of “everything is a file”.

In 2017, it was estimated that there were still over 100,000 companies using AS/400 technology, including a great number of insurance firms.

Timex Datalink

June 21, 1994

The Timex Datalink was co-developed with Microsoft as a wearable alternative to PDAs [Jan 7] with additional attributes such as water resistance. It was also certified by NASA for space travel.

The Datalink was demonstrated by Bill Gates [Oct 28] on this day, and Microsoft initially offered them as a mail-in bonus with every purchase of Office 95 [Aug 1].

The Timex Datalink 150. Photo by Dr. K. CC BY 3.0.

Early models included the Datalink 50, 70, 150 and 150s, with the numbers indicating the approximate number of phone numbers that could be stored in its memory.

Other features included synchronized contacts, appointments, and to-do lists. Its twelve WristApps included a stopwatch, countdown timer, and a golf scorekeeper. Third-party WristApps included a Space Invaders style game [June 5], and an application that emulated functions of the Antikythera mechanism [Aug 4]. They were coded in assembly using a WristApp SDK.

The device utilized a three-row LCD, a button-based ‘keyboard’, and received data by a PC rapidly flashing a series of barcodes on its screen that were read by a small camera on the watch's face. *PC World* remarked that the pulsating black-and-white stripes might also "turn you into The Manchurian Candidate".

The first watch that could exchange data with a computer was probably the Seiko UC-2000 [Jan 00].

Drivers Day

June 21, 2006

All Windows drivers are dated June 21, 2006, even those created long afterwards. A driver's version number will increase, but its date timestamp is never changed.

This fixed timestamp means that the system decides on which driver to use based on other criteria, including the hardware ID and version numbers.

The date's significance is that it was when Microsoft released the Windows Vista RTM (release to manufacturing) version. Current drivers only have to be compatible with this version of Windows, or newer.