# المحاضرة الأول: الحاسب الآلي:

ﻴﻌﺘﺒﺭ ﺍﻟﺤﺎﺴﻭﺏ ﺍﻟﺤﺩﻴﺙ ﻤﻥ ﺃﻫﻡ ﺍﻟﻤﻨﺠﺯﺍﺕ ﺍﻟﻌﻠﻤﻴﺔ ﺍﻟﺘﻲ ﺘﻭﺼل ﺇﻟﻴﻬﺎ ﺍﻟﻌﻘل ﺍﻟﺒﺸﺭﻱ ﻓﻲ

ﻫﺫﺍ ﺍﻟﻌﺼﺭ. ﻭﻗﺩ ﺒﺩﺃ ﺘﻁﻭﺭﻩ ﻤﻨﺫ ﻋﺩﺓ ﻗﺭﻭﻥ ﻭﺍﺴﺘﻤﺭ ﺇﻟﻰ ﺍﻥ ﻭﺼل ﺇﻟﻰ ﻤﺎ ﻫﻭ ﻋﻠﻴﻪ ﺍﻻﻥ ﻤﻥ ﺍﻻﻨﺘﺸﺎﺭ ﺍﻟﻜﺒﻴﺭ ﻭﺍﻻﺴﺘﺨﺩﺍﻡ ﺍﻟﻭﺍﺴﻊ ﻓﻲ ﻜل ﻤﺠﺎﻻﺕ ﺍﻟﺤﻴﺎﺓ. ﻭﺘﻡ ﺘﻘﺴﻴﻡ ﺘﻁﻭﺭ ﺍﻟﺤﺎﺴﺏ ﺇﻟﻰ ﺜﻼﺜﺔ

ﺃﻗﺴﺎﻡ :

## ﻤﺭﺍﺤل ﺘﻁﻭﺭ ﺍﻟﺤﺎﺴﻭﺏ

**) ﻅﻬﻭﺭ ﺍﻻﺠﻬﺯﺓ ﺍﻟﻴﺩﻭﻴﺔ (**

### .1ﺍﻟﻤﺭﺤﻠﺔ ﺍﻷﻭﻟﻰ :

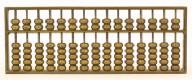
ﻫﻲ ﺍﻟﻤﺭﺤﻠﺔ ﺍﻟﻤﺒﻜﺭﺓ ﻭﺍﻟﺘﻲ ﺘﻤﺘﺩ ﺤﺘﻰ ﻤﻨﺘﺼﻑ ﺍﻟﻘﺭﻥ ﺍﻟﺴﺎﺒﻊ ﻋﺸﺭ ﻭﺘﻤﺘﺎﺯ ﺒﺘﻁﻭﻴﺭ ﺃﺠﻬﺯﺓ ﺤﺴﺎﺏ

ﻴﺩﻭﻴﺔ ﻭﺒﺎﻻﻨﺘﺎﺝ ﺍﻟﻌﻠﻤﻲ ﺍﻟﺫﻱ ﺘﻭﺼل ﺇﻟﻴﻪ ﺍﻟﻌﺩﻴﺩ ﻤﻥ ﺍﻟﻌﻠﻤﺎﺀ ﻓﻲ ﻤﺠﺎل ﺍﻟﻌﻠﻭﻡ ﺍﻟﺭﻴﺎﻀﻴﺔ ﻭﺍﻟﻔﻴﺯﻴﺎﺌﻴﺔ.

ﻭﺘﻘﺴﻡ ﺇﻟﻰ ﺜﻼﺜﺔ ﺩﻭﺭﻴﺎﺕ :

2000\*ﻕ.ﻡ : ﻁﻭﺭ ﺍﻟﺼﻴﻨﻴﻭﻥ ﺁﻟﺔ ﺘﺴﺎﻋﺩ ﻓﻲ ﺍﻟﺘﻌﺎﻤل ﻤﻊ ﺍﻷﻋﺩﺍﺩ ﺘﺴﻤﻰ ﺍﻟﻤﻌﺩﺍﺩ ﻭﻴﻌﺩ ﻭﺴﻴﻠﺔ

ﻴﺩﻭﻴﺔ ﺠﻴﺩﺓ ﻟﻠﻌﺩ ﻭﺍﻟﺤﺴﺎﺏ. ﻭﺍﺴﺘﻌﻤل ﻤﻥ ﻗﺒل ﺍﻟﻤﺼﺭﻴﻴﻥ ﻭﺍﻟﻴﻭﻨﺎﻨﻴﻴﻥ ﻭﺍﻟﺭﻭﻤﺎﻥ.



ﺷﻜﻞ (1-1) : اﻟﻤﻌﺪاد Abacus

ﺠﻌﻔﺭ ﻤﺤﻤﺩ ﺒﻥ ﻤﻭﺴﻰ ﺍﻟﺨﻭﺍﺭﺯﻤﻲ

ﺘﺄﻟﻴﻑ ﻜﺘﺎﺏ "ﺍﻟﺠﺒﺭ ﻭﺍﻟﻤﻘﺎﺒﻠﺔ" ﻤﻥ ﻗﺒل ﺍﻟﻌﺎﻟﻡ ﺃﺒﻭ

:ﻡ825\*

) ﺍﻟﺨﻭﺍﺭﺯﻤﻴﺎﺕ ( ﻟﺘﻨﻔﻴﺫ ﺍﻟﻌﻤﻠﻴﺎﺕ

ﻭﻫﻭﺼﺎﺤﺏ ﻓﻜﺭﺓ ﺍﻟﻁﺭﻕ ﻭﺍﻟﺨﻁﻭﺍﺕ ﺍﻟﻤﻜﺘﻭﺒﺔ

ﺍﻟﺤﺴﺎﺒﻴﺔ ﻟﻠﺤﺼﻭل ﻋﻠﻰ ﺍﻟﻨﺘﺎﺌﺞ ﺍﻟﻤﻁﻠﻭﺒﺔ.

ﻭﺍﻟﻌﺭﺒﻴﺔ، ﻭﺍﻟﺘﻲ ﺍﻤﺘﺎﺯﺕ

ﺍﻟﻤﻴﻼﺩﻱ: ﺍﻨﺘﺸﺭ ﺍﺴﺘﺨﺩﺍﻡ ﺃﻨﻅﻤﺔ ﺍﻟﻌﺩ ﺍﻟﻬﻨﺩﻴﺔ

ﺍﻟﺜﺎﻨﻲ ﻋﺸﺭ

\*ﺍﻟﻘﺭﻥ

ﺒﺘﺄﻜﻴﺩﻫﺎ ﻋﻠﻰ ﻗﻴﻤﺔ ﻜل ﺭﻗﻡ ﺤﺴﺏ ﻤﻭﻀﻌﺔ (Position) ﺩﺍﺨل

ﺍﻟﻌﺩﺩ. ﻭﻴﻤﺘﺎﺯ ﻨﻅﺎﻡ ﺍﻟﻌﺩ ﺍﻟﻌﺭﺒﻲ ﺒﻭﺠﻭﺩ ﺍﻟﺼﻔﺭ ﺒﻌﻜﺱ ﻨﻅﺎﻡ ﺍﻟﻌﺩ

ﺍﻟﺭﻭﻤﺎﻨﻲ ﺍﻟﺫﻱ ﻻ ﻴﺤﺘﻭﻱ ﻋﻠىﺎﻟﺼﻔﺭ.

### .2ﺍﻟﻤﺭﺤﻠﺔ ﺍﻟﺜﺎﻨﻴﺔ :

**)ﻅﻬﻭﺭ ﺍﻟﺤﺎﺴﺒﺎﺕ ﺍﻟﻤﻴﻜﺎﻨﻴﻜﻴﺔ ﻭﺍﻟﻜﻬﺭﻭﻤﻴﻜﺎﻨﻴﻜﻴﺔ(**

ﺍﻟﻔﺭﻨﺴﻲ ﺒﻠﻴﺯ ﺒﺎﺴﻜﺎل ﺍﺴﺘﻌﻤﻠﻬﺎ ﻟﺠﻤﻊ

ﺍﻟﻌﺎﻟﻡ

ﺁﻟﺔ ﻤﻴﻜﺎﻨﻴﻜﻴﺔ ﻨﺼﻑ ﺁﻟﻴﺔ ﻤﻥ ﻗﺒل

ﺍﺨﺘﺭﺍﻉ

*:*ﻡ**1642**

ﻋﻠﻠﻰ ﻤﺤﻴﻁ ﻜل ﻤﻨﻬﺎ ﻭﻋﻠﻰ ﻤﺴﺎﻓﺎﺕ

ﻨﻘﺸﺕ

ﺍﻻﻋﺩﺍﺩ ﻭﻜﺎﻨﺕ ﺘﺘﻜﻭﻥ ﻤﻥ ﺩﻭﺍﻟﻴﺏ ﻤﻌﺩﻨﻴﺔ

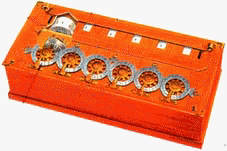
ﻤﻨﺘﻅﻤﺔ ﺍﻻﺭﻗﺎﻡ ﺍﻟﻌﺸﺭﻴﺔ.

ﺸﻜل ) 2-1 ( : ﻟﻭﻴﺯ ﺒﺎﺴﻜﺎل ﻭ ﺁﻟﺘﻪ ﺍﻟﻤﻴﻜﺎﻨﻴﻜﻴﺔ

1692ﻡ : ﻗﺎﻡ ﺍﻟﻌﺎﻟﻡ ﻟﻴﺒﻴﺯ ﺒﺈﺠﺭﺍﺀ ﺇﻀﺎﻓﺎﺕ ﺇﻟﻰ ﺁﻟﺔ ﺒﺎﺴﻜﺎل ﻟﺘﺼﺒﺢ ﻗﺎﺩﺭﺓ ﻋﻠﻰ ﺘﻨﻔﻴﺫ ﻋﻤﻠﻴﺔ

ﺍﻟﻀﺭﺏ ﻭﻟﻜﻥ ﺩﻗﺔ ﻫﺫﻩ ﺍﻵﻟﻪ ﻟﻡ ﺘﻜﻥ ﻜﺎﻓﻴﺔ.



ﺸﻜل ) 3-1 ( : ﺁﻟﺔ ﺒﺎﺴﻜﺎل ﺒﻌﺩ ﺍﻟﺘﻁﻭﻴﺭ

1806ﻡ: ﺍﺴﺘﻁﺎﻉ ﺍﻟﻌﺎﻟﻡ ﺍﻟﻔﺭﻨﺴﻲ ﺠﻭﺯﻴﻑ ﺠﺎﻜﻭﺍﺭﺩ ﺇﺩﺨﺎل ﺘﺤﺴﻴﻥ ﻋﻠﻰ ﻓﻜـﺭﺓ ﺍﺴـﺘﻌﻤﺎل ﺁﻻﺕ

ﻨﺴﻴﺞ ﻤﺒﺭﻤﺠﺔ ﺒﻭﺴﺎﻁﺔ ﺸﺭﻴﻁ ﻭﺭﻗﻲ ﻤﺜﻘﺏ.



ﺸﻜل ) 4-1 ( : ﺍﻟﻭﺭﻕ ﺍﻟﻤﺜﻘﺏ ﺍﻟﺫﻱ ﺃﺴﺘﺨﺩﻤﻪ ﺠﺎﻜﻭﺍﺭﺩ

1832ﻡ: ﻗﺎﻡ ﺍﻟﻌﺎﻟﻡ ﺍﻹﻨﺠﻠﻴﺯﻱ ﺸﺎﻟﺭﺯ ﺒﺎﺒﺎﺝ ﺒﺘﺼﻤﻴﻡ ﺁﻟﺔ ﺤﺎﺴﺒﺔ ﻤﻴﻜﺎﻨﻴﻜﻴﺔ )ﺁﻟﺔ ﺍﻟﻔﺭﻕ( ﻗﺎﺩﺭﺓ ﻋﻠﻰ

ﺇﺠﺭﺍﺀ ﺍﻟﻌﻤﻠﻴﺎﺕ ﺍﻟﺤﺴﺎﺒﻴﺔ ﻭﺒﻌﺽ ﺍﻟﻌﻤﻠﻴﺎﺕ ﺍﻵﺨﺭﻯ )ﺍﻟﻠﻭﻏﺎﺭﻴﺘﻤﺎﺕ، ﻭﺍﻟﻨﺴﺏ ﺍﻟﻤﺜﻠﺜﻴﺔ

ﻟﺯﻭﺍﻴﺎ ﺒﺎﺴﺘﺨﺩﺍﻡ ﻓﺭﻕ ﻤﺭﺒﻌﺎﺕ ﺍﻻﻋﺩﺍﺩ.(



ﺷﻜﻞ ) 5-1 ( : ﺷﺎرﻟﺰ ﺑﺎﺑﺎج وآﻟﺘﮫ اﻟﻤﯿﻜﺎﻧﯿﻜﯿﺔ ) آﻟﺔ اﻟﻔﺮق Engine Difference (

1833ﻡ: ﺒﺩﺃ ﺸﺎﺭﻟﺯ ﺒﺎﺒﺎﺝ ﺒﺘﺼﻤﻴﻡ ﺁﻟﺔ ﺤﺎﺴﺒﺔ ﺠﺩﻴﺩﺓ ﻫﻲ ﺍﻵﻟﺔ ﺍﻟﺘﺤﻠﻴﻠﻴﺔ ﻭﺍﻤﺘﺎﺯﺕ ﺒﺎﻟﺩﻗﺔ ﺍﻟﻌﺎﻟﻴﺔ ﺤﻴﺙ

ﻭﺼل ﻁﻭل ﺍﻟﺭﻗﻡ ﺍﻟﻤﺴﺘﻌﻤل 50 ﺨﺎﻨﺔ. ﻭﻴﻌﺩ ﺒﺎﺒﺎﺝ ﺍﻻﺏ ﺍﻟﺤﻘﻴﻘﻲ ﻟﻠﺤﺎﺴﺏ ﺍﻟﺤﺩﻴﺙ ﻓﻬﻭ

ﺘﺸﺒﻪ ﻓﻜﺭﺓ

ﻭﻅﻴﻔﻴﺔ

ﺃﻭل ﻤﻥ ﺃﻭﺠﺩ ﻓﻜﺭﺓ ﺍﻟﺒﺭﻨﺎﻤﺞ ﺍﻟﻤﺨﺯﻭﻥ ﻭﻗﺴﻡ ﺤﺎﺴﺒﺘﻪ ﺇﻟﻰ ﻭﺤﺩﺍﺕ

ﺍﻟﺘﻘﺴﻴﻡ ﺍﻟﻤﺴﺘﺨﺩﻤﺔ ﻓﻲ ﺍﻟﺤﻭﺍﺴﻴﺏ ﺍﻟﺤﺩﻴﺜﺔ .

ﻜﺘﺎﺒﺔ "ﺍﺴﺘﻘﺭﺍﺀ ﻗﻭﺍﻨﻴﻥ ﺍﻟﺘﻔﻜﻴﺭ" ﺍﻟﺫﻱ ﻭﻀﻊ

ﻗﺎﻡ ﺍﻟﺭﻴﺎﻀﻲ ﺍﻻﻨﺠﻠﻴﺯﻱ ﺠﻭﺭﺝ ﺒﻭﻭل ﺒﻨﺸﺭ

:ﻡ1854

ﺍﻟﺫﻱ ﻴﻌﺩ ﻟﺒﻨﺔ ﻫﺎﻤﺔ ﻓﻲ ﺘﺼﻤﻴﻡ ﺍﻟﻌﻤﻠﻴﺎﺕ

ﺍﻟﻤﻨﻁﻘﻲ

ﻓﻴﻪ ﻭﻓﻲ ﺃﻋﻤﺎﻟﻪ ﺍﻟﻼﺤﻘﺔ ﺃﺴﺱ ﺍﻟﺠﺒﺭ

ﺍﻟﻤﻨﻁﻘﻴﺔ ﻟﻠﺤﺎﺴﻭﺏ ﺍﻟﺤﺩﻴﺙ .



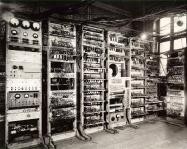
اﻟﻤﺴﻄﺮة اﻟﻤﻨﺰﻟﻘﺔ rule slide اﻟﻘﺎﻃﻊ sector

ﺸﻜل ) 6-1 ( : ﺃﺩﻭﺍﺓ ﺍﻟﺤﺴﺎﺏ ﻭﺍﻟﻘﻴﺎﺱ ﺍﻟﻤﺴﺘﺨﺩﻤﺔ ﺒﻌﺩ ﻋﺎﻡ 1800

1887ﻡ: ﺘﻤﻜﻥ ﺍﻟﻌﺎﻟﻡ ﺍﻻﻤﺭﻴﻜﻲ ﻫﻴﺭﻤﺎﻥ ﻫﻭﻟﻴﺭﺙ ﻤﻥ ﺼﻨﻊ ﺁﻟﺔ ﻟﺘﺜﻘﻴﺏ ﺍﻟﺒﻁﺎﻗﺎﺕ ﻭﺁﻟﺔ ﺘﺒﻭﻴﺏ

ﺍﺴﺘﻌﻤﻠﺕ ﻓﻲ ﺇﺠﺭﺍﺀ ﺇﺤﺼﺎﺀ ﺍﻟﺴﻜﺎﻥ ﻓﻲ ﺍﻟﻭﻻﻴﺎﺕ ﺍﻟﻤﺘﺤﺩﺓ.

1890ﻡ: ﺘﺄﺴﻴﺱ ﺸﺭﻜﺔ ﻻﻨﺘﺎﺝ ﺁﻻﺕ ﺍﻟﺘﺒﻭﻴﺏ ﺤﻴﺙ ﺘﻭﺴﻌﺕ ﻫﺫﻩ ﺍﻟﺸﺭﻜﺔ ﻭﺍﺘﺤﺩﺕ ﻤﻊ ﺸﺭﻜﺎﺕ

ﺃﺨﺭﻯ ﻭﺃﺩﺕ ﺍﻟﻰ ﻅﻬﻭﺭ .(IBM)

1939ﻡ: ﺒﺩﺃﻫﻭﺍﺭﺩ ﺁﻴﻜﻥ ﻤﻥ ﺠﺎﻤﻌﺔ ﻫﺎﻓﺎﺭﺩ ﺒﺘﺼﻤﻴﻡ ﺁﻟﺔ ﺤﺎﺴﺒﺔ ﻟﺤل

ﻤﺴﺎﺌل ﻋﻤﻠﻴﺔ ﻭﺭﻴﺎﻀﻴﺔ.

ﻤﻥIBM

1944ﻡ: ﺘﻤﻜﻥ ﺁﻴﻜﻥ ﻭﺠﺭﻴﺱ ﻫﻭﺒﺭ ﺒﻤﺴﺎﻋﺩﺓ ﻤﻥ ﺸﺭﻜﺔ

ﺇﻨﺘﺎﺝ ﺃﻭل ﺁﻟﺔ ﺤﺎﺴﺒﺔ ﻜﻬﺭﻭﻤﻴﻜﺎﻨﻴﻜﻴﺔ ﺴﻤﻴﺕ Mark-1

ﺷﻜﻞ ) 7-1 ( : أول ﺣﺎﺳﺒﺔ ﻛﮭﺮوﻣﯿﻜﺎﻧﯿﻜﯿﺔ Mark-1

### .3ﺍﻟﻤﺭﺤﻠﺔ ﺍﻟﺜﺎﻟﺜﺔ :

**)ﻅﻬﻭﺭ ﺍﻟﺤﺎﺴﺒﺎﺕ ﺍﻻﻟﻜﺘﺭﻭﻨﻴﺔ(**

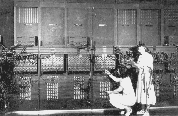
1945ﻡ: ﻗﺎﻡ ﻓﺭﻴﻕ ﻤﻥ ﺍﻟﻤﻬﻨﺩﺴﻴﻥ ﻓﻲ ﺠﺎﻤﻌﺔ ﺒﻨﺴﻠﻔﺎﻨﻴﺎ ﺒﻘﻴﺎﺩﺓ ﺠﻭﻥ ﻤﻭﺸﻠﻲ ﻭﺇﻴﻜﻴﺭﺕ ﺒﺈﻨﺘﺎﺝ

ﺤﺎﺴﻭﺏ ﻓﻲ ﻜﻠﻴﺔ ﻤﻭﺭ ﻟﻠﻬﻨﺩﺴﺔ ﺍﻟﻜﻬﺭﺒﺎﺌﻴﺔ ﻭﺴﻤﻲ

( ENIAC : Electronic Numerical Integrator And Calculation )

ﺤﻴﺙ ﻴﻌﺘﺒﺭ ﻫﺫﺍ ﺍﻟﺠﻬﺎﺯ ﺃﻭل ﺤﺎﺴﺏ ﺇﻟﻜﺘﺭﻭﻨﻲ.





ﺷﻜﻞ ) 8-1 ( : ﺣﺎﺳﺒﺔ ENIAC

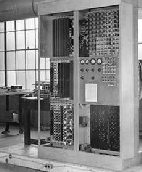
1946ﻡ: ﺇﻨﺘﺎﺝ ﺠﻬﺎﺯ ﻴﺴﻤﻰ :

( EDVAC : Electronic Discrete Variable Automatic Computer )

ﻤﻥ ﻗﺒل ﻨﻔﺱ ﺍﻻﺸﺨﺎﺹ ﺒﺎﻻﻀﺎﻓﺔ ﺇﻟﻰ ﺍﻟﻌﺎﻟﻡ ﺠﻭﻥ ﻓﻭﻥ ﻨﻴﻭﻤﺎﻥ ﺍﻟﺫﻱ ﺭﻜﺯ ﺠﻬﻭﺩﻩ ﻋﻠﻰ

ﺍﻟﻤﻨﻁﻕ ﻭﺍﻟﺒﺭﻤﺠﺔ ﻭﺘﻭﺼل ﺇﻟﻰ ﻓﻜﺭﺓ ﺘﺨﺯﻴﻥ ﺍﻟﺒﺭﻨﺎﻤﺞ ﻭ ﺍﻟﺒﻴﺎﻨﺎﺕ ﺩﺍﺨل ﺫﺍﻜﺭﺓ ﺍﻟﺤﺎﺴﺏ

ﻋﻠﻰ ﺸﻜل ﺃﺭﻗﺎﻡ ﻓﻲ ﻨﻅﺎﻡ ﺍﻟﻌﺩ ﺍﻟﺜﻨﺎﺌﻲBinary) .(System



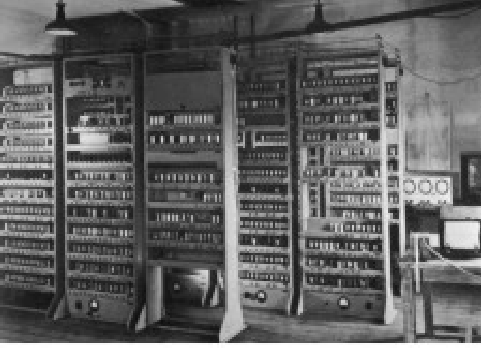
ﺷﻜﻞ ) 9-1 ( : ﺣﺎﺳﺒﺔ EDVAC

1949ﻡ : ﺃﻨﺘﺎﺝ ﺠﻬﺎﺯ ﻴﺴﻤﻰ

( EDSAC : Electronic Delay Storage Automatic Calculator )

ﻤﻥ ﻗﺒل ﻤﺠﻤﻭﻋﺔ ﻤﻥ ﺍﻟﺒﺎﺤﺜﻴﻥ ﻓﻲ ﺠﺎﻤﻌﺔ ﻜﻤﺒﺭﺩﺝ، ﺤﻴﺙ ﺍﺴﺘﻌﻤﻠﺕ ﻓﻴﻪ ﺨﻁﻭﻁ ﺍﻟﺘﺄﺨﻴﺭ ﺍﻟﺯﺌﺒﻘﻴﺔ ﻜﺫﺍﻜﺭﺓ ﻭﻜﺫﻟﻙ ﻤﺭﺍﺠﻴﺢ(Flip-Flops)ﻤﺭﻜﺒﺔ ﻤﻥ ﺍﻟﺼﻤﺎﻤﺎﺕ ﺍﻻﻟﻜﺘﺭﻭﻨﻴﺔ ﺍﻟﻤﻔﺭﻏﺔ ﻭﻴﻌﺘﺒﺭ ﺍﻟﺠﻬﺎﺯ ﺃﻭل ﺤﺎﺴﻭﺏ ﻴﻌﻤل ﻋﻠﻰ ﺃﺴﺎﺱ ﻓﻜﺭﺓ ﺍﻟﺒﺭﻨﺎﻤﺞ ﺍﻟﻤﺨﺯﻭﻥ ﺩﺍﺨل

ﺍﻟﺫﺍﻜﺭﺓ.



EDSAC

ﺷﻜﻞ ) 1 – 10 ( ﺣﺎﺳﺒﺔ

1952ﻡ: ﺇﻨﺘﺎﺝ ﺠﻬﺎﺯ ﻴﺴﻤﻰ

(UNIVersal Automatic Computer)

(UNIVAC)ﻭﻫﻭ ﺃﻭل ﺠﻬﺎﺯ ﻴﺘﻡ ﺇﻨﺘﺎﺠﻪ

ﻤﻥ ﻗﺒل ﻤﻭﺸﻠﻲ ﻭﺍﻴﻜﻴﺭﺕ ﺒﻌﺩ ﺍﻟﺘﺤﺎﻗﻬﻤﺎ ﺒﺸﺭﻜﺔ

ﻭﺘﺴﻭﻴﻘﺔ ﻋﻠﻰ ﺃﺴﺎﺱ ﺘﺠﺎﺭﻱ.



UNIVAC

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