

computer Basic

computer : الكمبيوتر is a device that receives, stores, and processes data

.Data: raw facts representing objects and events البيانات : الحقائق الأولية التي تمثل الاشياء والاحداث

.Information: data that is organized, meaningful and useful المعلومات : بيانات منظمة وذات مغزى ومفيدة

القدرة على التخزين
 Fundamental Characteristics of Computers : 1- speed Reliability*2 capability Storage*3
 خصائص الكمبيوتر

Diyaa Suboh

computer system components المكونات المادية Hardware: the physical components of a computer system
 e.g., monitor, keyboard, mouse, hard drive

2. Software : the programs that execute on the computer المكونات البرمجية
 e.g., word processing program, Web browser

3 People: 1. Programmer : writes software المبرمج : يكتب البرمجيات

2. End-User; purchases and uses software المستخدم النهائي : عمليات الشراء و الاستخدام للبرنامج

انواع الحواسيب Computer Classes

- 1- computers Personal حواسيب شخصية
- 2- computers Portable أجهزة الكمبيوتر المحمولة
- 3- Servers الخوادم
- 4- Computers Super
- 5- Devices Handheld الأجهزة المحمولة
- 6- Systems Embedded الأنظمة المنظمة

Types of Computers

- super computers : powerful but expensive (e.g., weather forecasting, engineering design and modeling)
- desktop computers : less powerful but affordable (e.g., email, Web browsing, document processing)
- laptop computers: similar functionality to desktops

Hardware

1 Control Unit 1. Directs the computer system to execute stored program instructions تنفيذ تعليمات البرنامج المخزن
 2. Communicate with memory and ALU
 3. Sends data and instructions from secondary storage to memory as needed
 يرسل البيانات والتعليمات من التخزين الثانوي إلى الذاكرة حسب الحاجة.

1 - cpu

2. Arithmetic Logic Unit 1. Arithmetic operation 2. logic operations:
 e.g Addition, Subtraction , Multiplication, Division (Equal, Less than, Greater than...)

3. Registers
- 1. High-speed temporary storage areas مناطق تخزين مؤقتة عالية السرعة
 - 2. Storage locations located within the CPU مواقع تخزين داخل المعالج
 - 3. ❖ Work under direction of control unit العمل تحت اشراف الوحدة المعالجة المركزية
 - 4. □ Accept, hold, and transfer instructions or data قبول و حفظ و نقل البيانات
 - 5. Keep track of where the next instruction to be executed or needed data is stored تعقب مكان تخزين البيانات او التعليمات المطلوب تنفيذها

2- Memory : is that part of a computer that stores programs and data جزء من الكمبيوتر يخزن البيانات و المعلومات

- (modern computers are digital devices, meaning they store and process information as binary digits (bits))

الكمبيوتر الحديث هي اجهزة رقمية مما انها تخزن المعلومات و تعالجها كارقام ثنائية

. two values of a bit are written as 0 and 1, but the values could just as easily be represented as off and on, open and

closed, volts and no volts. الخ , off and on , open and closed , volts and no volts : مثل منكتب البت رقمين 1 :: 0 ويتم تمثيل البيانات بسهولة

.memory capacity is usually specified in bytes- عادة ما تكون بشكل البايت

terabyte = 1024 gigabyte / gigabyte = 1024 megabyte / megabyte = 1024 kilobyte / 1 kilobyte = 1024 byte / 1 bits : 8 byte ملاحظات هامة

memory

- primary storage RAM , ROM
- secondary storage Flash memory ,DVD,BD,floppy disk , fard disk ,magnetic taces

ROM	RAM
Read only memory (ذاكرة القراءة فقط)	Random Access Memory (ذاكرة الوصول العشوائي)
Non-volatile (غير متطاير)	Volatile (متطايرة... متطايرة)
Permanent storage (التخزين الدائم)	Temporary storage (التخزين المؤقت)
Read only (للقراءة فقط)	Read and Write (القراءة و الكتابة)
Stores the program required to initially boot the computer يخزن البرنامج المطلوب لبدء تشغيل الكمبيوتر	Allows the computer to read data quickly to run applications يسمح للكمبيوتر بقراءة البيانات بسرعة لتشغيل التطبيقات

in put device : Keyboard mouse scannar mic sensors
out put device : screen prenter speakers camara

Software refers to the programs that execute on that hardware

program is a collection of instructions for the computer to carry out in order to complete some task مجموعة من التعليمات التي يجب على الكمبيوتر تنفيذها لكمال بعض المهام e.g., word processing program, Web browser, Adobe, Photoshop

1- operating system

: is an interface between hardware and applications

it is responsible for the management and coordination of activities and the sharing of the limited resources of the computer

مسؤولة عن إدارة وتنسيق الأنشطة وتقاسم الموارد المحدودة للكمبيوتر

2- OS CONT Is a collection of programs that controls how the CPU, memory, and I/O devices work together

manages the execution of all application programs controlling how data and instructions are loaded into memory and accessed by the CPU

عبارة عن مجموعة من البرامج التي تتحكم في كيفية عمل وحدة المعالجة المركزية والذاكرة وأجهزة الادخال / الاخراج معا

operating system provides an interface for the user to interact with the computer (GUI)

يوفر نظام التشغيل واجهة للمستخدم للتفاعل مع الكمبيوتر

numbring systems Diyaa Suboh

Decimal System	Binary System	Octal System	Hexadecimal System	sivinty system
Most People Use decimal representation to count	Computer is electronic machine with two states	Using 8 digits	Uses 16 digits	uses 7 digits
The base is 10	the base is 2	The base is 8	The base is 16	the base is 7
0,1,2,3,4,5,6,7,8,9	0 1	0,1,2,3,4,5,6,7	0, 1,2,3,4,5,6,7,8,9 ,A,B,C,D,E,F,G	0,1,2,3,4,5,6,

word = 2 byte = 4 nibble = 16 bits = 16 digits / Nibble = 4 bits = 4 digits = 1/2 byte / byte = 8 digits = 8 bit

Bit = digits (مطلوبة حفظ) 2 = 1+1 منطقيا وثنائي 10

Binary Addition

1 1101 + 0110 = 10011

01111 + 00110 =
 0 1 1 1 1
 + 0 0 1 1 0

 1 0 1 0 1

11010011 + 01010110 =

1 1 1 1
 1 1 0 1 0 0 1 1 → (211)₁₀
 + 0 1 0 1 0 1 1 0 → (86)₁₀

 1 0 0 1 0 1 0 0 1 = (297)₁₀

101001₂ ... ()₁₀
 منخط هون محل الصفر القيمة صفر و محل الواحد القيمة 1
 لل 2 بتكرارها 2ⁿ الخ
 2⁰ * 1 + 2¹ * 0 + 2² * 0 + 2³ * 1 + 2⁴ * 0 + 2⁵ * 0 + 2⁶ * 1 = 41

(55)₁₀ = ()₂
 منقسم العدد ع 2 في حال كان زوجي يكون الباقي 0 اما فردي يكون 1
 110111 =

(66)₈ = ()₁₀
 6 * 8¹ + 6 * 8⁰ = 48 + 6 = 54

(892)₈ = ()₂
 منقولها مباشره الى ثنائي يعني 8 الى ثنائي (كل رقم لحال)
 (1000 1001 0010)

10010101₂ = ()_h

1001 0101 = (95h)

11100011₂ = (E3h) H.W

Let's convert the value (39)₁₀ to Hexadecimal

Input	Result	Remainder
39/16	2	7
2/16	0	2

(39)₁₀ = (27h)

Convert the following numbers to decimal

- a. (72)₈ = (58)₁₀
- b. (72)₁₆ = (114)₁₀
- c. (DE1)₁₆ = (3553)₁₀

ملاحظة: Signed Numbers هو عبارة عن قلب الصفر واحد والواحد صفر واذا كان العدد الموجب منكتب Positive واذا كان سالب Negative
 مثلا 5 = 101 وهي عبارة عن 0101 ونقلب اول رقم تصبح سالب 1101 مثال 2: الرقم 100101 هو عبارة عن 011010 بالسالب

Converting Fractions

Convert 11.375₁₀ to it's binary

11 = 1011	0.375 * 2 = 0.750	0	7
0.375	0.750 * 2 = 1.500	1	500
11.375 = 1011.011	0.500 * 2 = 1.000	1	000

2. (0.0075)₈ :
 1. (0.0075)₈ to binary:
 From the table: 7=111
 5=101 = (0.00000111101)₂

ملاحظة: جمع الكسور الثنائية نفس طريقة الجمع العادية للثنائي

Binary Subtractor

Example: 00110010₂ + (-125)₁₀

125 → 01111101

1's complement → 10000010
 2's complement → + 1
 10000011 → (-125)

00110010₂ + (-125)₁₀

00110010	- 50
+ 10000011	- 125
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10110101	-75

Data Representation تمثيل البيانات

هون راح نمثل البيانات ب 0, 1
 ملاحظة: even زوجي, odd فردي
 ex. Alrad

Memory

C1
68
6D
61
64

مثلا اكتب اسم احمد عبر ASCII بشرط ان يكون odd فردي

Parity bit	A 1 1100001 = C1 ₁₆	Parity bit	h 0 1101000 = 68 ₁₆
Parity bit	x 0 1101101 = 6D ₁₆	Parity bit	a 0 1100001 = 61 ₁₆
Parity bit	d 0 1100100 = 64 ₁₆		

ملاحظات Exponent هي دائما قيمتها 127 بالاضافة الى عدد الارقام بعد الرقم الاول

امثلة على تمثيل البيانات

1. (-203):

Input	Result	Remainder
203/2	101	1
101/2	050	1
050/2	025	0
025/2	012	1
012/2	006	0
006/2	003	0
003/2	001	1
001/2	000	1

= (11001011)₂

To be 16 bits: (0000000011001011)₂

Two's complement: 1111111100110100 + 1

From the table: **F F 3 5**

35
FF

Low-High

Exp : Using the **even parity** bit to represent the character **Q (Q = 81 in ASCII)** in memory (Hexadecimal) ?

استخدام بت التكافؤ الزوجي لتمثيل الحرف Q (Q = 81 في الذاكرة) سداسي عشري؟

الرقم 81 نعمل على تمثيله بالثنائي $D1_{16} = (81)_{10} = (01010001)_2$

نضع رقم الاخير وهو 0 كرقم اضافي ونعمل على اضافة صفر او واحد لنجعل الرقم الثنائي رقم زوجي كذلك ف يجب اضافة الرقم 1 فيصبح لدينا اربعة ارقام تمثل بالثنائي تمثل واحد زوجي ثم نعمل على تحويله الى سادس عشر باخذ كل اربع ارقام مجموعة. فيمثل الرقم $D1_{16}$

Parity bit	1	1010001	= D1 ₁₆
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نعمل على تحويل من العشري الى الثنائي **نحول** $(62.57)_{10} = (01011.11)_2$ الى ثنائي كما ذكر سابقا $(01011.11)_2 = (1.110101 * 2^4)_2$ ثم تضرب ب 2^4 نعمل على تحريك الاشارة بمقدار 4 ثم تضرب ب 2^4

Exponent = $127+4=131$ $(131)_{10} = (10000011)_2$

Memory	00
	00
	D6
	41

algorithm

An **algorithm** is a **procedure** or **formula** for solving a problem. الخوارزمية هي إجراء أو صيغة لحل مشكلة.

- **Pseudocode** is a kind of structured English for describing algorithms. It allows the designer to focus on the logic of the algorithm without being distracted by details of language syntax

• **Pseudocode** هو نوع من الإنجليزية المنظمة لوصف الخوارزميات. انها تسمح للمصمم التركيز على منطق الخوارزمية دون ان يكون مشتتاً بتفاصيل تركيب اللغة.

كيفية انشاء الخوارزميات --

<p>in put : Read ...optain .. get</p> <p>out put : print ...display .. show</p> <p>compute : compute , calculate</p> <p>initilize : set</p> <p>Add one: INCREMENT</p> <p>Greater than > ... Greater than</p>	<p>read num 1 and save as n</p> <p>print("sum")</p> <p>calculate avg ... calculate sum</p> <p>set num 1 equal zero</p> <p>increment counter</p> <p>Or equal >=... less than <</p>	<p>الجمع : ADD</p> <p>قسمة : div</p> <p>ضرب : multiPly</p> <p>ناقص : subscriber</p> <p>less than Or equal <= .. equal = ... <>Not equal</p>
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رموز و الاشارات (مطلوب الاشارات كتابة بالخوارزميات)

انواع الخوارزميات

write an alogaithem to find and print the sum of two integers

تسلسلي sequitial

start

ask user to enter the first intege

read the first integer and save as F_1

ask user to enter the second integer

read the second integer and save S_1

add F_1 to S_1 and save result as sum

print ("sum") to screen

end

Write an algorithm to find and print the area of rectangle

مساحة المستطيل = الطول * العرض

rectangle area = heigth * width

start

ask user to enter the heighth of rectangle

Read heighth and save as H

ask user to enter the width of rectangle

read width and save as W

multiPIY H by W and save the ruselt as area

Display area

end

write an alogaithem to find and print the area of square

مساحة المربع = الجانب * الجانب

square = side * side

Start

ask user to enter the side

Read side and save as S

Multiply s by s and save result as E

display ("E")

End

مشروط Conditional

شرط (if ... case)

اذا كان لدينا شرط واحد

if condition then

Sequence

End if

اذا كان لدينا اكثر من شرط نكتب

else if الشرط نستخدم

if condition then

Sequence 1

else if condition then

Sequence 2

else if condition then

Sequence 3

else if condition then

Sequence 4

else

Sequence 5

End if

1 exp

Write an algorithm to print passed OR failed based on the students Grade

Start

ASk user to enter student grade

Read grade and save as stg

if stG greater than or equal I sixty then

print ("pass")

else

print ("failed")

end if

End

2 Write an algorithm to find and print the miximum element of a set of 4 integers

Start

Ask user to enter the first integer

Read the first integer and save as F

Ask user to enter the Second integer

Read the Second integer and save as S

Ask user to enter the thirty integer

Read the thirty integer and save as T

Ask user to enter the fourty integer

Read the fourty integer and save as FF

let max equal to the F

if max less than S then

set max to s

else if max less than T then

set max to T

else if max less than FF then

set max to FF

End if

print "the max integer is" max

End

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Write an algorithm to find and print the smallest of four given numbers (assume all) numbers are different

```

Start
Ask user to enter first number
Read number and save as num1
Ask user to enter second number
Read number and save as num2
Ask user to enter third number
Read number and save as num3
Ask user to enter fourth number
Read number and save as num4
If num1 smaller than num2 and num1 smaller than num3 and num 1 smaller than num 4 then
    print "num1 is the smallest"
else If num2 smaller than num1 and num2 smaller than num3 and num 2 smaller than num 4 then
    print "num2 is the smallest "
else If num3 smaller than num1 and num3 smaller than num2 and num 3 smaller than num 4 then
    print "num3 is the smallest"
else
    print "num4 is the smallest"
end if
End
    
```

Write an algorithm to read a number x and display its sign

```

Start
Ask user to enter a number
Read number and save as X
If x is greater than zero then
    print x "is positive"
else if x is equal zero then
    print x "is zero"
else
    print x "is negative"
end if
    
```

Write an algorithm that will input student average. If the average is greater than or equal to 60 and less than or equal to 70, the algorithm should display "Passed". If it is greater than 70 and less than or equal to 80, print "Good". If it is greater than 80 and less than 90, print "Very good". If it is greater than 90, print "Excellent". If it is less than 60 the prints "Fail"

```

Start
Ask user to enter student average
Read average and save as ag
If ag is greater than or equal to sixty and ag is less than or equal to seventy then
    print "Pass"
else if ag is greater than seventy and ag is less than or equal to eighty then
    print "Good"
else if ag is greater than eighty and ag is less than ninety then
    print "Very good"
else if ag is greater than ninety then
    print "Excellent"
else
    print "Fail"
end if
End
    
```

في ثلاث صيغات هوون

iterative	WHILE condition sequence End while	REPEAT sequence End REPEAT	FOR iteration bounds sequence End FOR
	<p>Write an algorithm if the first number of the value x is 2 where x is greater than or equal to 6</p> <pre> Start Set i equal to two While i less than or equal six print i add two to i end while End </pre>	<p>Write an algorithm to calculate the average of a set of 10 students</p> <pre> Start Set counter to zero Set total to zero While counter is less than ten Ask user to enter grade Read grade and save as gd Add the gd into the total increment counter end while Set the average to the total divided by counter Print "the average is " average End </pre>	

Write an algorithm that will count the number of student pass in a class and the amount failed. The pass mark is more than or equal to 65. Suppose the number of students are 30 . The algorithm should output the amount fail and

```

Start
Set counter to zero
Set passCounter to zero
Set failureCounter to zero
While counter less than thirty
    Ask user to enter student average
    Read average and save as ag
    if ag greater than or equal sixty five then
        increment passCounter
    else
        increment failureCounter
    end if
    increment counter
end while
Print "pass counter =" passCounter" and failure counter ="failureCounter
End
    
```

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