

Applications Programming

General Introduction of Computer Data

Common Use of Computers

- Entertainment
- Word Processing
- Information/Data Storage and Processing
- Solving Math Problems
- Communication

Information vs Data

- Information — usually described and unformatted:
There are a list of products in our store: 4-person tent priced at \$159.99, all-weather sleeping bag sold at \$49.99, etc
- Data — usually formatted:

Product ID	Product Name	Price
103758	4-person tent	159.99
372957	all-weather sleeping bag	49.99
186598	48-quart hard cooler	33.99
...

Data Representation

- Bits and Bytes
- Common Data Types
 - Text
 - Numbers
 - Dates
 - Image/sound/graph/special formatting, etc

Data Interpretation

- Inside the computer, all data are encoded as binary strings.
- Data type is associated with a fixed set of interpretation rules used by computer to determine the “information” hidden in the binary string.
- Different data types have different interpretation rules.
- Example:
 - 01000001 — as text — “A”
 - 01000001 — as number — 65
 - DEC3 — as text — “DEC3”
 - DEC3 — as date — “December 3rd”

Selected ASCII Table

Letter	Code	Binary	Letter	Code	Binary	Letter	Code	Binary	Letter	Code	Binary	Letter	Code	Binary
a	97	1100001	n	110	1101110	A	65	1000001	N	78	1001110	0	48	0110000
b	98	1100010	o	111	1101111	B	66	1000010	O	79	1001111	1	49	0110001
c	99	1100011	p	112	1110000	C	67	1000011	P	80	1010000	2	50	0110010
d	100	1100100	q	113	1110001	D	68	1000100	Q	81	1010001	3	51	0110011
e	101	1100101	r	114	1110010	E	69	1000101	R	82	1010010	4	52	0110100
f	102	1100110	s	115	1110011	F	70	1000110	S	83	1010011	5	53	0110101
g	103	1100111	t	116	1110100	G	71	1000111	T	84	1010100	6	54	0110110
h	104	1101000	u	117	1110101	H	72	1001000	U	85	1010101	7	55	0110111
i	105	1101001	v	118	1110110	I	73	1001001	V	86	1010110	8	56	0111000
j	106	1101010	w	119	1110111	J	74	1001010	W	87	1010111	9	57	0111001
k	107	1101011	x	120	1111000	K	75	1001011	X	88	1011000			
l	108	1101100	y	121	1111001	L	76	1001100	Y	89	1011001			
m	109	1101101	z	122	1111010	M	77	1001101	Z	90	1011010			

Data Source

- Manually entered into the computer
- Generated data
 - Transactional data
 - Crowdsourced data
 - Social data
 - Search data
 - Machine data
- Imported from somewhere

Data Presentation

- Same data item can have different presentation:
23/12/2019 or 12/23/2019
Dec-23-2019
23-Dec-2019
December 23rd, 2019
December 23rd, 2019, Monday
- Different data items sometimes can have the same presentation.
12.02 can mean a floating point number
12.02 can also mean a software's version code
- It's up to the program/business logic to determine how to interpret the meaning of the data. Interpreted data becomes information.

Data Operations

- Data Collection, Storage and Presentation
- Data Manipulation
 - Data manipulation is the way in which data can be manipulated and changed.
 - Data can be copied around.
 - New bit patterns can be generated from operations on other existing data patterns.
- Data Processing
 - Computerized process that converts data to information