System BI0401-01/598-0208 Feb 2021



Raster Data Types

GDAL data type	minimum
Byte	Θ
UInt16	Θ
Int16, CInt16	-32,768
UInt32	Θ
Int32, CInt32	-2,147,483,648
Float32, CFloat32	-3.4E38
Float64, CFloat64	-1.79E308

https://grass.osgeo.org/grass78/manuals/r.out.gdal.html



maximum

255 65,535 32,767 4,294,967,295 2,147,483,647 3.4E38 1.79E308

Bit and Bytes Bit

 Binary Digit represented by: 0 and 1 and their combinations



Bit and Bytes Byte

 unit of digital information • commonly consisted of 8 bits historically : one word length

Bit and Bytes





Binary System



Conversion

• Binary to decimal $(1010)_2 = (10)_{10}$

Conversion

• Decimal to binary



Conversion remainder



Conversion

- $(10)_{10} / (2)_{10} = 5..0$
- $(5)_{10} / (2)_{10} = 2..1$
- $(2)_{10} / (2)_{10} = 1..0$
- $(1)_{10} / (2)_{10} = 0..1$

1 0 1

Application



Application

Question:

how many numbers we can represent using our 10 fingers in the binary mode?

Application

Question : tranquilizer

- 100 recipes, only one effective
- 7 testing animals

er effective

Application 001 | 0 0 0 0 0 0 1 002 | 0 0 0 0 0 1 0 003 | 0 0 0 0 0 1 1

100 | 1 1 0 0 1 0 0

 $\bullet \bullet \bullet$

xxx | 1234567

outcome:156



Floating-point



Definition

Floating point number system

- real numbers
- based on the idea of scientific notation

Definition

example:

 $31415926 = 3.1415926 \times 10^7$

Definition

- exercise:
- -0.0000313

Definition $x=\pm\left(d_0+rac{d_1}{eta^1}+rac{d_2}{eta^2}+\ldots+rac{d_{p-1}}{eta^{p-1}} ight)eta^E$ β : base p: precision[L, U] : exponent range $0\leq d_i\leqeta-1$

 $E\in [L,U]$

Acknowledgement

Thanks for Your Attention

I am too full because $\sqrt{-1}$ 2^3

 π .