Data Storage:

text file in ASCII format   date.txt

line ⟶ $\begin{bmatrix} 1.23 & 21 & 9.2 & -1.1 \\ & & & \\ \vdots & \vdots & \vdots & \vdots \\ & & & \end{bmatrix}$

line ⟶

arranged in lines and columns

size of the file = (8 bits) × lines × # characters per line.
                        1B

works but not efficient for large data samples

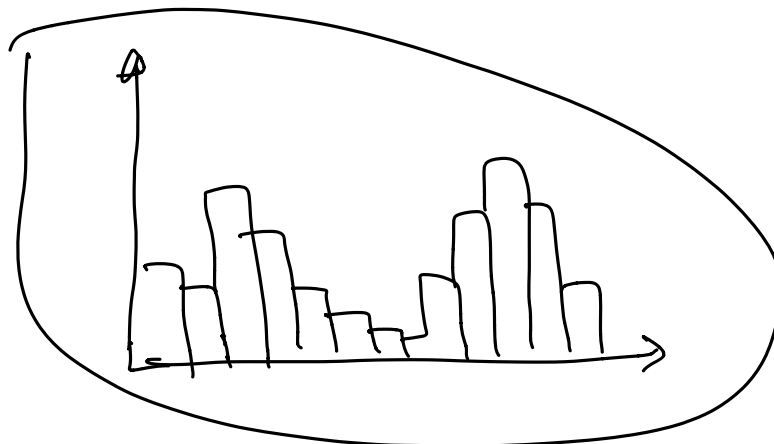spreadsheet: excel, numbers, Google Sheet, open office

CSV: Comma separated values

a, b, c, d, --- , z

↳ , : FIELD separator

machine / OS / architecture dependent
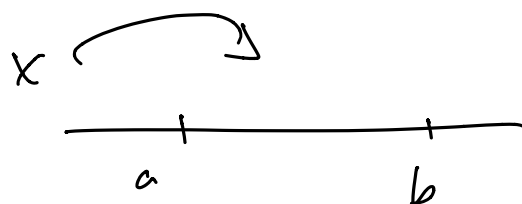

In ROOT we use TFile class

THIF

1.2 ← double

h1 ← Tiff ?

how can we store them in a file?

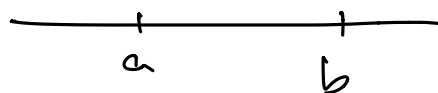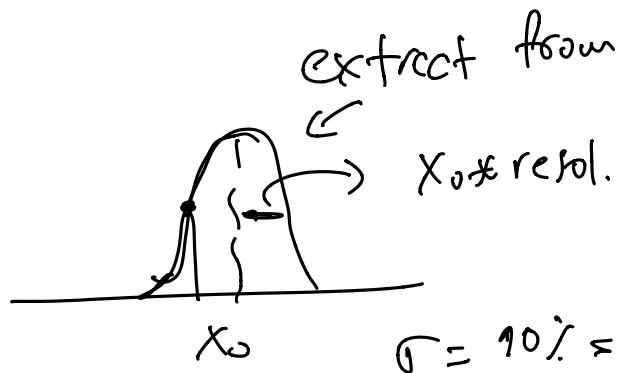simple example

x

$x \in [a,b]$

True value

Resolution

effect

$\mu = 0$

$x_0 \in [a,b]$

x_0

extract from

$x_0 \pm$ resol.

x_0 $\sigma = 10\% = 0.10$

0.9   1.0   1.1

$x_0 = 1.1$

1.1

$9.1 - 3 \times 0.11 = 0.77$
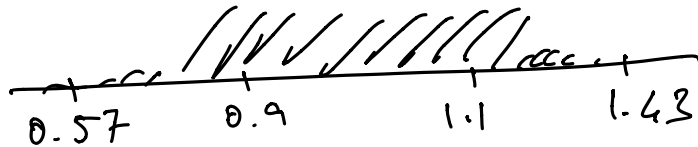
x_0
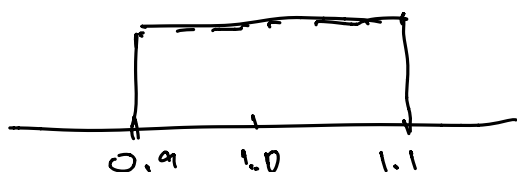
$w = \overbrace{1.1}^{x_0} \times 0.10 = 0.11$

$w = 0.11$

$1.1 + 3 \times 0.11 = 1.43$

$x_0 = 0.9$
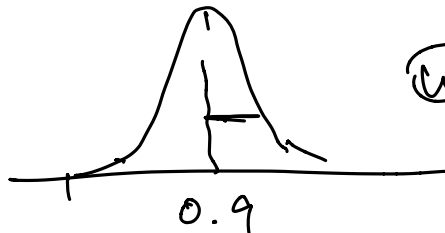
$$\textcircled{W} = \frac{0.9 \times 0.10}{x_0 \times \sigma} = \boxed{0.09}$$
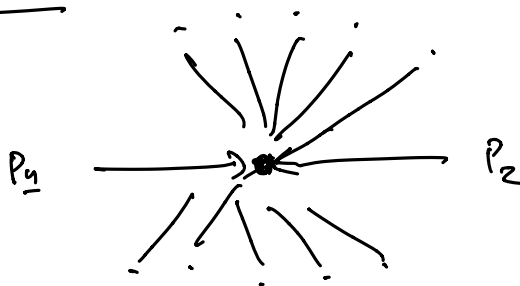
0.9

$0.9 - 3 \times 0.09 = 0.9 - 0.27 = 0.63$

0.57   0.9   1.1   1.43

Exercise: generate $x \in [0.999, 1.001]$

$(0.999999, 0.000001)$

↙

You should see   Std dev ≈ 0.10

collision

P_1 →   → P_2 1 event

N particles   one per event

momentum } one per particle
energy

primary vertex   one per event

| #partics | Prim.Ver. | Mom P1 | E P1 | mom P2 | E P2 | — — — |

N times.

| #particle | PV | energy | Momentum |

energy: N elements
Momentum: N elements

event / leaf

Branch   Branch   Branch
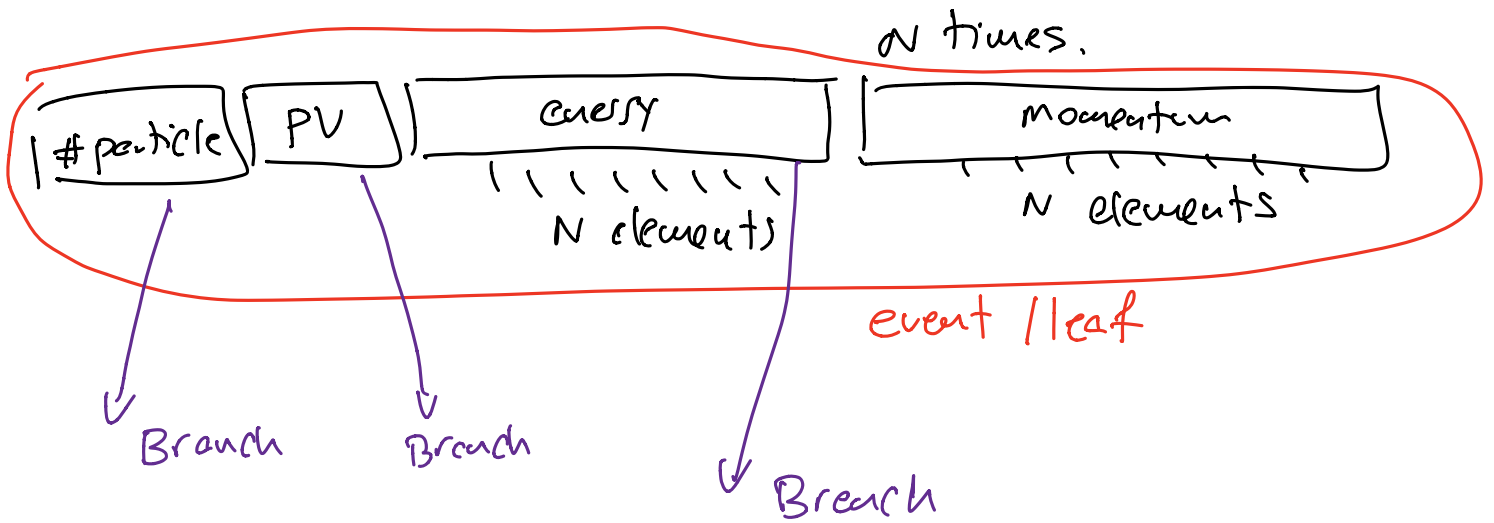
Tree
└→ Branches: #part.
PV
Mom
enery.
} structure

Data points or events : "leafs"

| event 1 | $N = 10$
| event 2 | $N = 3$
| event 3 | $N = 6$

$\vdots$

| event 10^6 | $N = 2$

Simple Tree example

def tree
    └→ value / D
        └→ error / D

tree → Fill ( )   →