ROOT Exercise 1

The aim of this exercise is to use ROOT to analyse purchase operations from an imaginary pumpkin market. Each data entry corresponds to a transaction between the shop and a farmer who sells his pumpkins (each farmer performs only one transaction). Some farmers have bigger farms, others have smaller farms – each one brings a different number of pumpkins (`n`). There are five different types of pumpkins: orange, green, yellow, red and white distinguished by the variable `color` equal 0, 1, 2, 3 and 4, respectively. Finally, every pumpkin has a weight stored in a variable called `mass` [kg].

Preparation and interactive work

1. Download data from a small, local pumpkin market:
   `wget ppss.ifj.edu.pl/materials_2019/pumpkins_small.root`
2. Open the downloaded file and browse its content.
3. How many farmers sold their pumpkins?
4. How many pumpkins were sold by 10th farmer? Which colors? What masses?
5. How many farmers sold exactly two pumpkins? (use `Scan` method)

Histograms via `TTree::Draw`

7. Download data from a huge, country-wide pumpkin market:
   `wget ppss.ifj.edu.pl/test/pumpkins_big.root`
8. Find and read documentation for `TTree::Draw(char*, char*, char*, int, int)`.
9. What is the distribution of pumpkin colors (among all pumpkins)?
10. How many pumpkins have been purchased?
11. What is the distribution of pumpkin masses (among all pumpkins)?
12. What is the distribution of yellow pumpkin masses?
13. What is the distribution of the number of pumpkins from each farmer (among all farmers)? How does it look like in the logarithmic scale in the vertical axis?
14. Is there a correlation between the color and weight of pumpkins?

Nice plots

Create a macro that:

15. loads the data file (`TFile`),
16. produces mass distributions for all pumpkins and for each color (`TTree::Draw("…>>h(…)", …)`),
17. sets the axis titles, line colors, etc.,
18. draws everything together in a plot like: