Storage and retrieval of the geometry

- How to dump geometry to and load geometry from a file
  - in a `root` session;
  - in an AliRoot session.
- How to align volumes on the fly

Dump/load geometry in a root session:

- Load the geometry library:
  root[ ] gSystem→Load(‘‘libGeom.so’’);
  (not needed if make map done after make in $ROOTSYS)
- To dump the geometry to a file:
  root[ ] gGeoManager→Export(‘‘filename.root’’);
- To have the geometry saved as C++ code:
  root[ ] gGeoManager→Export(‘‘filename.C’’);
- To load the geometry from file in a later root-session
  use the static member function Import():
  root[ ] TGeoManager::Import(‘‘filename.root’’);

Dump/load geometry in an AliRoot session:

- root[ ] `gAlice→Init("Config.C");`
  takes care of loading the geometry from a file if the config-file contains the following lines:
  ```
  new TGeant3TGeo("C++ Interface to Geant3");
  gAlice→SetRootGeometry();
  gAlice→SetGeometryFileName("geomfile.root");
  ```
- This is the geometry passed to the VMC and used in the transport but presently is not used by digitization and reconstruction (see later talks).
- To save it for later use or reference:
  root[ ] `gGeoManager→Export("fileneme.root");`

Visualize the geometry:

- Import geometry-file (as explained in previos slide):
  root[ ] `TGeoManager::Import("ALICE.root");`
- Open the `TBrowser`:
  root[ ] `TBrowser browser;`
- Click on `Geometry` folder and see what is available
- right-click on the volume to visualize and click on the `Draw` option on the option-panel
- in the newly-opened canvas you can choose also the `X3D` and `OpenGL` viewers from `View->ViewWith`

Align volumes on the fly

- After geometry has been loaded it is open and can be modified at run time. To modify the position of (= to align) a volume use its path;
- To align a specific volume you need to:
  1. declare it as a physical node:
     `TGeoPhysicalNode* node = (TGeoPhysicalNode*) gGeoManager→MakePhysicalNode(char* volpath);`
     where e.g. `"ALIC_1/TPC_1/TDGN_1/TORC_26"` is the volpath for the 26^{th} Tpc Outer Readout Chamber

2. to instantiate the alignment transformation (in general a composition of a rotation and a translation):

```
TGeoRotation* rot = new TGeoRotation("rot", t1,
p1, t2, p2, t3, p3); //GEANT angles in degrees
```

or better

```
TGeoRotation* rot = new TGeoRotation("rot", phi,
theta, psi); //euler angles in degrees
combi = new TGeoCombiTrans(xc, yc, zc, rot);
```

⋆ then you can call the alignment method:

```
node→Align(combi);
```

⋆ Soon it will be possible with the following lines in the config-file:

```
gAlice→SetGeometryToAlign();
gAlice→SetAlignmentFileName("alignmentfile");
```

after: `gAlice→SetRootGeometry();`