

# User Interface

Example of main() with UI/Vis

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Based on Makoto Asai (SLAC) slides



# Generic main() function

```
#include "EDDetectorConstruction.hh"
#include "EDActionInitialization.hh"
#include "G4RunManager.hh"
#include "FTFP_BERT.hh"
int main(int argc, char** argv)
{
    // Create User Interface and enter in interactive session (1)

    // Construct the default run manager
    G4RunManager* runManager = new G4RunManager; // Detector construction

    runManager->SetUserInitialization(new EDDetectorConstruction());

    // Physics list
    G4VModularPhysicsList* physicsList = new FTFP_BERT; runManager->
    SetUserInitialization(physicsList);

    // User action initialization
    runManager->SetUserInitialization(new EDActionInitialization()); // Initialize G4 kernel

    runManager->Initialize();

    // Create User Interface and enter in interactive session (2)
}
```

# User interface

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- The user command interface (UI) is set via the `G4UIExecutive` class
  - UI represent the interactive session where users can type Geant4 commands which are then executed with means of `G4UImanager`
  - It can handle the program arguments (`argc`, `argv`)

```
int main(int argc,char** argv)
{
    G4UIExecutive* ui = new G4UIExecutive(argc, argv);

    ...
    ui->SessionStart();
}
```

# Visualisation

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- The visualization manager is set via the `G4VisExecutive` class

```
int main(int argc, char** argv)
{
    G4UIExecutive* ui = new G4UIExecutive(argc, argv);

    ...
    G4VisManager* visManager = new G4VisExecutive;
    visManager->Initialize();

    ...
    ui->SessionStart();
}
```

# Start a macro

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- Typically before starting the UI session, the visualization driver is initialized via a set of visualization commands in the macro `init_vis.mac`

```
int main(int argc, char** argv)
{
    G4UIExecutive* ui = new G4UIExecutive(argc, argv);
    ...

    G4VisManager* visManager = new G4VisExecutive;
    visManager->Initialize();
    ...
    G4UImanager* UImanager = G4UImanager::GetUIpointer();
    UImanager->ApplyCommand("/control/execute init_vis.mac");
    ...
    ui->SessionStart();
}
```

# Start a GUI macro

- Since Geant4.10.3, a default macro icons is already defined if the application is run with a graphical qt user interface. But it can also be enhance with commands defined in a macro, icons.mac. Don't forget to disable defaults icon set with “/gui/defaultIcons” in that case

```
int main(int argc,char** argv). {
  G4UIExecutive* ui = new G4UIExecutive(argc, argv);
  ...
  G4VisManager* visManager = new G4VisExecutive;
  visManager->Initialize();
  ...
  G4UImanager* UImanager = G4UImanager::GetUIpointer();
  UImanager->ApplyCommand("/control/execute init_vis.mac »);
  if (ui->IsGUI()) {
    UImanager->ApplyCommand("/gui/defaultIcons false");
    UImanager->ApplyCommand("/control/execute icons.mac");
  }
  ...
  ui->SessionStart();
}
```

# Batch mode

- Finally, we will add a “batch” mode:
  - % myApplication run.mac

The program arguments are passed in main() program via the arguments:

argc = number of arguments

argv = the array of the arguments as

```
int main(int argc, char** argv). {
    G4UIExecutive* ui = 0;
    if ( argc == 1 ) {
        ui = new G4UIExecutive(argc, argv);
    }
    ...
    if ( ! ui ) {
        // Batch mode
        G4String command = "/control/execute ";
        G4String fileName = argv[1];
        UImanager->ApplyCommand(command+fileName);
    }
    else {
        // Define interactive UI session
```

## Example of main - part 2

```
int main(int argc, char** argv) {
// Detect interactive mode (if no arguments) and define UI session
G4UIExecutive* ui = 0;
if ( argc == 1 ) {
    ui = new G4UIExecutive(argc, argv);
}
// Construct the default run manager
.....
// Initialize visualization
G4VisManager* visManager = new G4VisExecutive;
visManager->Initialize();
// Get the pointer to the User Interface manager
G4UImanager* UImanager = G4UImanager::GetUIpointer();

if ( ! ui ) {
    // Batch mode
    G4String command = "/control/execute ";
    G4String fileName = argv[1];
    UImanager->ApplyCommand(command+fileName);
}
else {
    // Interactive mode
    UImanager->ApplyCommand("/control/execute init_vis.mac");
    ui->SessionStart();
}
}
```