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# Basics of UI command

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# Geant4

# Contents

- ▶ Command syntax
- ▶ G4Uterminal

# Geant4 UI command

- ▶ A command consists of
  - ▶ Command directory
  - ▶ Command
  - ▶ Parameter(s)
- ▶ A parameter can be a type of string, boolean, integer or double.
  - ▶ Space is a delimiter.
  - ▶ Use double-quotes (") for string with space(s).
- ▶ A parameter may be "omittable". If it is the case, a default value will be taken if you omit the parameter.
  - ▶ Default value is either predefined default value or current value according to its definition
  - ▶ If you want to use the default value for your first parameter while you want to set your second parameter, use "!" as a place holder.

`/run/verbose 1`

`/vis/viewer/flush`

`/dir/command ! second`

# Command submission

- ▶ Geant4 UI command can be issued by
  - ▶ (G)UI interactive command submission
  - ▶ Macro file
  - ▶ Hard-coded implementation
    - ▶ Slow but no need for the targeting class pointer
    - ▶ Should **not** be used inside an event loop

```
G4UImanager* UI = G4UImanager::GetUIpointer();  
UI->ApplyCommand( "/run/verbose 1" );
```

- ▶ The availability of individual command, the ranges of parameters, the available candidates on individual command parameter **vary** according to the implementation of your application and may even **vary dynamically** during the execution of your job.
- ▶ some commands are available only for limited Geant4 **application state(s)**.
  - ▶ E.g. **/run/beamOn** is available only for *Idle* states.

# Command refusal

- ▶ Command will be refused if
  - ▶ Wrong application state
  - ▶ Wrong type of parameter
  - ▶ Insufficient number of parameters
  - ▶ Parameter out of its range
    - ▶ For integer or double type parameter
  - ▶ Parameter out of its candidate list
    - ▶ For string type parameter
  - ▶ Command not found

# Macro file

- ▶ Macro file is an ASCII file contains UI commands.
- ▶ All commands must be given with their **full-path directories**.
- ▶ Use “#” for comment line.
  - ▶ First “#” to the end of the line will be ignored.
  - ▶ Comment lines will be echoed if `/control/verbose` is set to 2.
- ▶ Macro file can be executed
  - ▶ interactively or in (other) macro file  
`/control/execute file_name`
  - ▶ hard-coded

```
G4UImanager* UI = G4UImanager::GetUIpointer();  
UI->ApplyCommand("/control/execute file_name");
```



# Available Commands

- ▶ You can get a list of available commands including your custom ones by
  - /control/manual [directory]
  - ▶ Plane text format to standard output
  - /control/createHTML [directory]
  - ▶ HTML file(s)
- ▶ List of built-in commands is also available in section 7.1 of *User's Guide For Application Developers*.

# G4Uterminal

- ▶ G4Uterminal is a concrete implementation derived from G4UIsession abstract class. It provides character-base interactive terminal functionality to issue Geant4 UI commands.
  - ▶ C-shell or TC-shell (Linux only)  
`new G4Uterminal(new G4UITcsh);`
- ▶ It supports some Unix-like commands for directory.
  - ▶ `cd`, `pwd` - change and display current command directory
    - ▶ By setting the current command directory, you may omit (part of) directory string.
  - ▶ `ls` - list available UI commands and sub-directories
- ▶ It also supports some other commands.
  - ▶ `history` - show previous commands
  - ▶ `!historyID` - re-issue previous command
  - ▶ arrow keys (TC-shell only)
  - ▶ `?UIcommand` - show current value
  - ▶ `help [UIcommand]` - help
  - ▶ `exit` - job termination
- ▶ Above commands are interpreted in G4Uterminal and are not passed to Geant4 kernel. You cannot use them in a macro file.