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THE FINUDA OFF-LINE PROGRAM ON UNIX: STEP "UNO"

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ABSTRACT

This technical note focuses on the work done to port the off-line program to the central Unix LNF's "cluster", to read and reconstruct raw straw data and to describe how to use this software and install it on the user account.

INTRODUCTION

The Monte Carlo (MC) and the Reconstruction (RC) program has been ported to UNIX (Dec-Alpha) and the raw data reading step has also been implemented. These programs are working and ready for debugging and for detailed studies.

The original libraries (**fidamc206.cmz** and **fidarc206.cmz**) to produce these programs were taken from VAX (AXFIN1$DKA500:[FINUDA.MONICA]) and installed in the $TOP directory **/exp/finuda/soft/rec** under FINUDAST account on LNF's UNIX "cluster". These 2 libraries produce the following interactive and batch mode programs:

1. **fidamc**: To generate MC data;
2. **fidarc** : To reconstruct MC data;
3. **fidard** : To reconstruct raw data.

While the VAX MC part of these libraries remains as it is, the raw data unpacking was done by doing an interface with a program written by L. Benussi (*stb_mon.f*) which calls the on-line unpacking raw data routine *read_lib.c*. Work is in progress to match the *read_lib* philosophy with the reconstruction program; in the meantime it is not called directly by the program but through *stb_mon.f* which produces a **tmp** file as input to the program. This tmp file is unpacked by the reconstruction raw data program (fidard) to fill the straw tubes and scintillators ZEBRA banks (routine strdecrd). At the moment, all these programs read and reconstruct one input file at a time.

These programs can be accessed by users from their account or by installing them in their area. The first option is done by defining some environment variables (described at the end of this report) and the second one by installing the libraries to their

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favorite directory.

DO IT YOURSELF

There are two steps to follow to install the program in your area. The first one is to install *stb_mon* and the second is to install the fida program. As mentioned before, this software resides on the $TOP directory **/exp/finuda/soft/rec**. First, create your top directory, for instance: **/exp/finuda/user/myown**.

1. **STB_MON**

   1. Create a sub-directory **rdread** under the top directory to transfer the stb_mon source to your area.
   2. Copy all the files from **/exp/finuda/soft/rec/rdread** to your **rdread** directory.
   3. Create a **data** and **obj** sub-directories in the **rdread** sub-directory.
   4. Copy all the files from **/exp/finuda/soft/rec/rdread/data** to your **rdread/data** directory.

Now, all the stb_mon source is in your directory and the compilation will be done after the fida program is installed.

2. **FIDA PROGRAM**

   1. Copy the libraries files **fidamc206.cmz** and **fidarc206.cmz** from **/exp/finuda/soft/rec** to your top directory.
   2. Copy also **geane321.cmz** which at this moment is not available in the Unix CERN library.
   3. Install the program by typing:
      cmz -install fidamc206 pro 321 fidarc206 inter

This command creates a directory called **off** under your top directory and a complete tree of sub-directories as a working environment. In addition, it compiles the MC program **off/scratch/batch/fidamc**. The directories created are:

1. **off/scratch/batch** ($SCB): Source and executable batch version.
2. **off/scratch/inter** ($SCI): Source and executable interactive version.
3. **off/outputs** ($OUT): Output from the programs.
4. **off/rdtapes** ($RDT): Output of MC data.
5. **off/inputs** ($INP): Input data card files for MC and MC and raw data.
6. **off/share** ($SHR): Geometry file (fida_geo.dat).
7. **off/geant** ($GEA): Geant source and libraries.
8. **off/work** ($WRK): Working directory.

Because this program is not completely released in cmz (code management system) format, you need to edit and copy some files in order to use this version of the library. In particular, edit sida_def.csh file to define all the above (in parenthesis) environment variables.

3. **Compilation**

In order to define these environment variables, edit the file **off/work/sida_def.csh** and add the line:

source $TOP/rdread/rdread_sym.csh

at the end. Then, do

source /exp/finuda/user/myown/off/work/sida_def.csh

to define the symbols needed for the fida and for the interface program. Now, go to your **/rdread** and compile stb_mon by typing:

make -fs make_read_lib

to produce the executable **rdread/obj/stb_mon.exe** which is run from **fidard**.

To produce the executable to read raw data, copy:

/exp/finuda/soft/rec/off/work/*rd*

to your **/work** directory. These 5 *rd* (.kumac and .csh) files are used to set the flag for the raw data code (-mcarlo) and to produce the program **fidard**.

CMZ is also used to modify and compile the programs. To start cmz, just type **cmz** to get the cmz prompt. To terminate the cmz session, type **exit** (NOT QUIT!) to release in a correct way all files connected to your job.

To compile the programs, start cmz and type **exec load** to define the MC program flags and then:

1. **exec rebuild**
   to produce the MC generation program (**$SCB/fidamc**) in batch mode.
2. **exec rebuild_rc**
   to produce the MC reconstruction program (**$SCB/fidarc**) in batch mode.
3. **exec rebuild_rc_int**
   to produce the MC reconstruction program (**$SCI/fidarc**) in interactive mode.

To produce the raw data programs, type **exec load_rd** to define the appropriated flags and:

1. **exec rebuild_rd**
   to produce the raw data reconstruction program (**$SCB/fidard**) in batch mode.
2. **exec rebuild_rd_int**
   to produce the raw data reconstruction program (**$SCI/fidard**) in interactive mode.

Of course, you don't need to compile all the programs at once but the ones you plan to run.

4. **Running**

To run these programs, type (from your work directory) the name of the program you want to run. For example, to run a program from the interactive directory type: **$SCI/fidard** to reconstruct raw data interactively and display the event.

To run a batch mode program in the background, copy **/exp/finuda/soft/rec/off/work/run_finuda** and **sub_finuda** to your work directory and edit **sub_finuda** to select the program you like to run.

The first time you run the program, you need to produce the geometry file **off/share/fida_geo.dat**. To do this, copy the files **fidarc.dat** and **fidamc.dat** from **/exp/finuda/soft/rec/off/inputs/** to your **$INP** directory and edit **fidamc.dat**. Uncomment the flag **FIGEOM** and comment the flag **DIGIT**, then **source sub_finuda** with the mc generation program selected. This run will produce **$SHR/fida_geo.dat** in your area. Now, you are ready to produce and reconstruct MC data and to read and reconstruct raw data.

The next step is to produce MC data. Comment the flag **FIGEOM**, uncomment the flag **DIGIT**, set the number of events to be produced (**TRIG**) in **fidamc.dat** and submit the program by sourcing again **sub_finuda**. This program will produce an output MC raw data file in the $RDT directory called runxxxxx_rdt.dat where xxxxx is the run number. To reconstruct this MC data, edit the file **fidarc.dat** and select the run number file you produced in the previous step and select **fidarc** in the sub_finuda and source it again. The output (log file, histograms, etc) will go to the $OUT directory.

To read and reconstruct raw data, select the run number and transfer it to **fidarc.dat** and select **fidard** in the sub_finuda and source it. The shell file **$TOP/rdread_sym.csh** (source by sida_def.csh) defines the location of the raw data. Righ now, this data is taken from **/exp/finuda/data/cosmic_test/raw_data/**. As I said before, **fidard** run stb_mon and it produces a tmp file which eventually needs to be removed from the tmp directory defined by rdread_sym.csh.

Finally, re-direct all the outputs and input by setting the variables in sida_def.csh and in rdread_sym.csh to run the finudast version of these programs from your area.

For further details on this subject, please contact M. Bertani who is in charge of the off-line software in FRASCATI.