

RUNNING MATLAB "HELLO, WORLD" EXAMPLE ON REMOTE LINUX SYSTEMS

This section covers the steps to run sample code in MATLAB using both interactive and batch job submission modes.

Please note that all code should be run only on the compute nodes either interactively or in the batch mode. Please DO NOT run any code on the login nodes. Acceptable use of login nodes is as follows: installing code, file transfer, file editing, and job submission and monitoring.

MATLAB ON ARC

MATLAB is an abbreviation for "matrix laboratory". It is a proprietary multi-paradigm programming language and numeric computing environment developed by MathWorks. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages. Arc supports running MATLAB programs either interactively or in batch mode.

CLONE THE GITHUB REPOSITORY

If you want to get a copy of the MATLAB programs and scripts used in the examples below then you can clone a GitHub repository using the following command

```
git clone \  
https://github.com/ritua2/documentation/MATLAB
```

RUNNING A SAMPLE MATLAB PROGRAM

A sample MATLAB program is shown in Listing 1. All this code does is print “Hello World!!” to standard output.

```
function [y] = hello_world
% hello_world This function returns
'Hello World!'

    y = 'Hello World!';
end
```

Listing 1: Sample MATLAB program - program_name.m

The MATLAB program can be run either in batch mode using a Slurm batch job-script or interactively on a compute node.

Running the code in Interactive-Mode: The program can be run interactively on a compute node using the following set of commands and the output will be displayed on the terminal:

```
[username@login001]$ srunk -p compute1 -n 1 -t 00:05:00  
--pty bash
```

```
[username@c001]$ ml matlab/R2021a
```

```
[username@c001]$ matlab -nojvm -nodisplay -r  
program_name
```

```
< M A T L A B (R) >
```

```
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```

```
R2021a
```

```
Update 3 (9.10.0.1684407) 64-bit (glnxa64)
```

May 27, 2021

For online documentation, see
<https://www.mathworks.com/support>
For product information, visit www.mathworks.com.

```
ans =
```

```
    'Hello World!'
```

Note: The '-nojvm' and '-nodisplay' options turn off all the graphics. This is the preferred way of running a Matlab non-interactive job. MATLAB needs to be called with the '-r' option which tells it to immediately run an m-function instead of presenting an interactive prompt to the user - if you forget the '-r', then your Matlab job will "run" and tie up resources for ever (you can type `exit()`, since you can have interactive access, but its preferable to use -r option). Note that the script is in a file called "program_name.m" (with a ".m" extension), but the Matlab file is called with "program_name" (without the ".m" extension).

If you are currently on a compute node and would like to switch back to the login node then please enter the `exit` command as follows:

```
[username@c001]$ exit
```

Running the code in Batch-Mode: A sample Slurm batch job-script to run the MATLAB program_name.m code in batch mode is shown in Listing 2. This script should be run from a login node.

```
#!/bin/bash
#
#SBATCH -J program_name
#SBATCH -o program_name.txt
#SBATCH -p compute1
#SBATCH -N 1
#SBATCH -n 1
#SBATCH -t 00:05:00

module load matlab

matlab -nojvm -nodisplay -r program_name
```

Listing 2: Batch Job Script for MATLAB code (job_script1.slurm)

Note: The '-nojvm' and '-nodisplay' options turn off all the graphics. This is the preferred way of running a Matlab non-interactive job. MATLAB needs to be called with the '-r' option which tells it to immediately run an m-function instead of presenting an interactive prompt to the user - if you forget the '-r', then your Matlab job will "run" and tie up resources forever (since you don't have interactive access and cannot tell it to exit). Note that the script is in a file called "program_name.m" (with a ".m" extension), but the Matlab file is called with "program_name" (without the ".m" extension).

The job-script shown in Listing 2 can be submitted as follows:

```
[username@login001]$ sbatch job_script1.slurm
```

The output from the Slurm batch-job shown in Listing 2 can be checked by opening the output file as follows:

```
[username@login001]$ cat program_name.txt
```

The matlab module version R2021a is loaded.

< M A T L A B (R) >

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R2021a Update 3 (9.10.0.1684407) 64-bit
(glnxa64)

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ans =

'Hello World!'