

ECEN 5803– Mastering Embedded Systems Architecture

Project 2 Module 3

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- In this module 3, three functions are implemented to perform following operations using bash:

- display the current running processes.
- display the current data and time, kernel version
- display the kernel dump
- blink LEDs

this has two operations depending on passed params:

(i) if 1 blink LEDs

(ii) anything else, heartbeat pattern

```
#!/bin/bash
✓ display_current_running_proc() {
    echo "Current running processes:"
    ps aux
    echo
}
✓ display_date_time_kernel() {
    local current_datetime
    current_datetime=$(date +"%Y-%m-%d %H:%M:%S")
    echo "Current date and time: $current_datetime"
    echo "Kernel version: $(uname -r)"
}
display_kernel_dump() {
    echo "Kernel dump:"
    cat /cygdrive/c/DumpStack.log.tmp
}
```

```
blink_leds() {  
    if [$1 -eq 1]  
    then  
        cd $led_dir/beaglebone:green:usr0  
        echo timer > trigger  
        cd $led_dir/beaglebone:green:usr1  
        echo timer > trigger  
        cd $led_dir/beaglebone:green:usr2  
        echo timer > trigger  
        cd $led_dir/beaglebone:green:usr3  
        echo timer > trigger  
        echo "leds should be blinking..."  
    else  
        cd $led_dir/beaglebone:green:usr0  
        echo heartbeat > trigger  
        cd $led_dir/beaglebone:green:usr1  
        echo heartbeat > trigger  
        cd $led_dir/beaglebone:green:usr2  
        echo heartbeat > trigger  
        cd $led_dir/beaglebone:green:usr3  
        echo heartbeat > trigger  
        echo "leds should be blinking..."  
    fi  
}
```

```
display_current_running_proc  
display_date_time_kernel  
display_kernel_dump
```

```
VAR=${1:-0}
```

```
blink_leds "$VAR"
```

- An function has also been implemented to copy the data returned by these three functions in a log file:

```
# Log file path
LOG_FILE="my_script_log.txt"

# Redirect the output of functions to the log file
{
    echo "----- Log started: $(date) -----"

    # Function calls and store the output in the log file
    display_current_running_proc
    display_date_time_kernel
    display_kernel_dump

    echo "----- Log ended: $(date) -----"
} >> "$LOG_FILE"
```

- Following is generated as an output after running the bash script in the linux on Beaglebone black:

```

Current date and time: 2023-08-01 03:43:15
Kernel version: 3.8.13-bone47
Kernel dump:
leds should be in heartbeat...
./script.sh: line 62: my_script_log.txt: No such file or directory
root@beaglebone:/home/debian# ./script.sh 1
Current running processes:
USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root         1  0.0  0.5  4496  2640 ?        Ss   02:19   0:01 /lib/systemd/sy
root         2  0.0  0.0      0     0 ?        S    02:19   0:00 [kthreadd]
root         3  0.0  0.0      0     0 ?        S    02:19   0:00 [ksoftirqd/0]
root         5  0.0  0.0      0     0 ?        S<   02:19   0:00 [kworker/0:0H]
root         7  0.0  0.0      0     0 ?        S<   02:19   0:00 [kworker/u:0H]
root         8  0.0  0.0      0     0 ?        S    02:19   0:00 [migration/0]
root         9  0.0  0.0      0     0 ?        S    02:19   0:00 [rcu_bh]
root        10  0.0  0.0      0     0 ?        S    02:19   0:02 [rcu_sched]
root        11  0.0  0.0      0     0 ?        S    02:19   0:00 [watchdog/0]
root        12  0.0  0.0      0     0 ?        S<   02:19   0:00 [khelper]
root        13  0.0  0.0      0     0 ?        S    02:19   0:00 [kdevtmpfs]
root        14  0.0  0.0      0     0 ?        S<   02:19   0:00 [netns]
root        16  0.0  0.0      0     0 ?        S    02:19   0:00 [bdi-default]
root        17  0.0  0.0      0     0 ?        S<   02:19   0:00 [kintegrityd]
root        18  0.0  0.0      0     0 ?        S<   02:19   0:00 [kblockd]
root        19  0.0  0.0      0     0 ?        S    02:19   0:00 [khubd]
root        20  0.0  0.0      0     0 ?        S    02:19   0:00 [irq/70-44e0b00
root        21  0.0  0.0      0     0 ?        S    02:19   0:00 [kworker/u:1]
root        24  0.0  0.0      0     0 ?        S    02:19   0:00 [irq/7-tps65217
root        27  0.0  0.0      0     0 ?        S    02:19   0:00 [irq/30-4819c00
root        36  0.0  0.0      0     0 ?        S<   02:19   0:00 [rpciod]
root        38  0.0  0.0      0     0 ?        S    02:19   0:00 [khungtaskd]
root        39  0.0  0.0      0     0 ?        S    02:19   0:00 [kswapd0]
root        40  0.0  0.0      0     0 ?        S    02:19   0:00 [fsnotify_mark]
root        41  0.0  0.0      0     0 ?        S<   02:19   0:00 [nfsiod]
root        42  0.0  0.0      0     0 ?        S<   02:19   0:00 [crypto]
root        45  0.0  0.0      0     0 ?        S<   02:19   0:00 [pencrypt]
root        46  0.0  0.0      0     0 ?        S<   02:19   0:00 [pdecrypt]
root        53  0.0  0.0      0     0 ?        S<   02:19   0:00 [OMAP UART0]
root        56  0.0  0.0      0     0 ?        S    02:19   0:00 [spil]
root        58  0.0  0.0      0     0 ?        S<   02:19   0:00 [kpsmoused]
root        62  0.0  0.0      0     0 ?        S    02:19   0:00 [irq/134-mm0]
root        74  0.0  0.0      0     0 ?        S<   02:19   0:00 [binder]
root        75  0.0  0.0      0     0 ?        S<   02:19   0:00 [deferwq]
root        76  0.0  0.0      0     0 ?        S    02:19   0:00 [kworker/u:2]
root       100  0.0  0.0      0     0 ?        S    02:19   0:00 [mmcqd/1]
root       101  0.0  0.0      0     0 ?        S    02:19   0:00 [mmcqd/lboot0]
root       103  0.0  0.0      0     0 ?        S    02:19   0:00 [mmcqd/lboot1]
root       109  0.0  0.0      0     0 ?        S<   02:19   0:00 [kworker/0:1H]
root       208  0.0  0.0      0     0 ?        S    02:19   0:00 [jbd2/mmcblk0p2
root       209  0.0  0.0      0     0 ?        S<   02:19   0:00 [ext4-dio-unwri
root       236  0.0  0.2   3712  1276 ?        Ss   02:19   0:00 /lib/systemd/sy
root       256  0.0  0.2   2544  1416 ?        Ss   02:19   0:00 /sbin/udev
avahi       613  0.2  0.2   2888  1496 ?        Ss   02:19   0:10 avahi-daemon: r
root       619  0.0  0.1   1332   684 ?        Ss   02:19   0:00 /usr/sbin/acpid
101        621  0.2  0.2   2716  1436 ?        Ss   02:19   0:12 /usr/bin/dbus-d
root       629  0.0  2.0  65016 10232 ?        Ss1  02:19   0:01 /usr/bin/node a
root       630  0.0  0.3   4600  1564 ?        Ss   02:19   0:00 /sbin/wpa_suppl
root       632  0.0  0.2   2916  1264 ?        Ss   02:19   0:00 /lib/systemd/sy
root       633  0.0  0.6  26436  3324 ?        Ss1  02:19   0:00 /usr/sbin/conso
root       634  0.0  0.6  24548  3156 ?        Ss1  02:19   0:00 /usr/lib/upower
root       635  0.0  0.2  27368  1500 ?        Ss1  02:19   0:00 /usr/sbin/rsysl
root       663  0.0  0.1   3340   724 tty1     Ss+  02:19   0:00 /sbin/agetty tt
root       664  0.0  0.1   3160   720 tty00    Ss+  02:19   0:00 /sbin/agetty -s
avahi      682  0.0  0.0   2760   500 ?        S    02:19   0:00 avahi-daemon: c
xrdp       847  0.0  0.1   4560   668 ?        S    02:19   0:00 /usr/sbin/xrdp
root       848  0.0  0.4  21252  2544 ?        Ss1  02:19   0:00 /usr/lib/policy
root       867  0.0  0.1   3356   692 ?        S    02:19   0:00 /usr/sbin/xrdp-
root       877  0.0  0.1   3352   704 ?        Ss   02:19   0:00 /usr/sbin/cron
root       879  0.0  0.1   5160   952 ?        Ss   02:19   0:00 /usr/sbin/sshd
root       896  0.0  0.5   5892  2680 ?        Ss   02:19   0:00 /usr/sbin/apach
www-data   904  0.0  0.3   5672  2004 ?        S    02:19   0:00 /usr/sbin/apach
www-data   914  0.0  0.4  227084 2376 ?        S1   02:19   0:00 /usr/sbin/apach
www-data   917  0.0  0.4  227076 2368 ?        S1   02:19   0:00 /usr/sbin/apach

```

```

www-data  917  0.0  0.4  227076  2368  ?      S1   02:19  0:00  /usr/sbin/apach
root      1003  0.0  0.0      0      0  ?      S    02:19  0:00  [file-storage]
root      1005  0.0  0.3   5416  1896  ttyGS0  Ss   02:19  0:00  /bin/login --
root      1061  0.6  1.3  23876  6996  ?      S    02:19  0:31  /usr/bin/python
root      1077  0.0  0.1   1780   568  ?      Ss   02:19  0:00  /usr/sbin/udhcp
root      1099  0.2  1.4  14760  7572  ?      S    02:19  0:13  /usr/bin/python
root      1177  0.0  0.3   4104  1964  ?      Ss   02:19  0:00  /sbin/dhclient
debian    1214  0.0  0.3   4144  1644  ttyGS0  S    02:19  0:00  -bash
root      1376  0.1  4.0  78980  20648  ?      Ss1  02:31  0:04  /usr/bin/node s
root      1793  0.0  0.0      0      0  ?      S    03:01  0:00  [kworker/0:0]
root      1834  0.0  0.2   4844  1492  ttyGS0  S    03:04  0:00  su root
root      1841  0.0  0.3   4168  1640  ttyGS0  S    03:04  0:00  bash
root      1988  0.0  0.0      0      0  ?      S    03:13  0:01  [kworker/0:1]
root      2212  0.0  0.2   2540  1044  ?      S    03:30  0:00  /sbin/udev
root      2220  0.0  0.2   2540  1044  ?      S    03:31  0:00  /sbin/udev
root      2374  0.0  0.2   3716  1112  ttyGS0  S+   03:43  0:00  /bin/bash ./scr
root      2375  0.0  0.1   4016  1000  ttyGS0  R+   03:43  0:00  ps aux

```

- Following data is obtained from the log file:

```

----- Log started: Mon Jul 31 21:33:26 IST 2023 -----
Current running processes:
      PID      PPID      PGID      WINPID      TTY      UID      STIME  COMMAND
      277       271       271       22272      pty0      197609  21:33:26  /usr/bin/ps
      264       263       264       22520      pty0      197609  21:27:20  /usr/bin/bash
      271       264       271       23012      pty0      197609  21:33:26  /usr/bin/bash
      263        1       263       24744      ?         197609  21:27:20  /usr/bin/mintty

Current date and time: 2023-07-31 21:33:26
Kernel version: 3.4.7-1.x86_64
Kernel dump:
----- Log ended: Mon Jul 31 21:33:27 IST 2023 -----

```

- (i) `chmod u+x script.sh` is used to convert the script into executable:

```

shprasad@DESKTOP-J19LHPD ~
$ chmod +x script.sh

shprasad@DESKTOP-J19LHPD ~
$ bash ./script.sh
Current running processes:
      PID      PPID      PGID      WINPID      TTY      UID      STIME  COMMAND
      1093      1092      1093       7232      pty1      197609  02:53:39  /usr/bin/bash
s  1166      1093      1166      22088      pty1      197609  03:19:10  /usr/bin/find
      1092        1       1092      23148      ?         197609  02:53:39  /usr/bin/mintty
      1188      1093      1188      18036      pty1      197609  03:28:01  /usr/bin/bash
      931       930       931      25184      pty0      197609  Jul 25   /usr/bin/bash
      1189      1188      1188      28552      pty1      197609  03:28:01  /usr/bin/ps

Current date and time: 2023-07-27 03:28:01
Kernel version: 3.4.7-1.x86_64
Kernel dump:
cat: /cygdrive/c/DumpStack.log.tmp: Device or resource busy

```