

Operációs rendszerek BSc

3. GYAK

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Készítette:

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a. A középső ablakban lehet látni a hívott függvényeknek a nevét. (Pl WinExec – elindít egy folyamatot)

[illegible]

b. A Kernel32.dll függőségeit a bal oldali ablakban lehet látni. Ezek többek között a NTDLL.DLL és a KERNELBASE.DLL

[illegible]

- c. Az NTDLL.dll exportálja a Windows Natív API-t, a vizsgálataim alapján többek között a szálkezelés is ezen keresztül történik.

1. Feladat – (3B) Linux parancsok

- a. “top” parancs, sok mindent listáz, pl. futó processzekről infókat.

```
firehawk@firehawk-VirtualBox: ~  
Co File Edit View Search Terminal Help  
top - 13:11:42 up 0 min, 1 user, load average: 2,07, 0,77, 0,27  
Tasks: 207 total, 1 running, 206 sleeping, 0 stopped, 0 zombie  
%Cpu(s): 0,2 us, 0,1 sy, 0,0 ni, 99,8 id, 0,0 wa, 0,0 hi, 0,0 si, 0,0 st  
MiB Mem : 3935,4 total, 2539,4 free, 651,2 used, 744,8 buff/cache  
MiB Swap: 923,3 total, 923,3 free, 0,0 used. 3045,3 avail Mem  


| PID         | USER            | PR        | NI       | VIRT         | RES         | SHR         | S        | %CPU       | %MEM       | TIME+          | COMMAND    |
|-------------|-----------------|-----------|----------|--------------|-------------|-------------|----------|------------|------------|----------------|------------|
| 1141        | firehawk        | 20        | 0        | 4893144      | 188264      | 108164      | S        | 0,7        | 4,7        | 0:10.61        | cinnamon   |
| 760         | root            | 20        | 0        | 1142448      | 67700       | 41928       | S        | 0,3        | 1,7        | 0:01.19        | Xorg       |
| 1363        | firehawk        | 20        | 0        | 466944       | 40204       | 31432       | S        | 0,3        | 1,0        | 0:00.26        | gnome-t+   |
| <b>1417</b> | <b>firehawk</b> | <b>20</b> | <b>0</b> | <b>14860</b> | <b>4160</b> | <b>3512</b> | <b>R</b> | <b>0,3</b> | <b>0,1</b> | <b>0:00.04</b> | <b>top</b> |
| 1           | root            | 20        | 0        | 167780       | 11412       | 8248        | S        | 0,0        | 0,3        | 0:01.38        | systemd    |
| 2           | root            | 20        | 0        | 0            | 0           | 0           | S        | 0,0        | 0,0        | 0:00.00        | kthreadd   |
| 3           | root            | 0         | -20      | 0            | 0           | 0           | I        | 0,0        | 0,0        | 0:00.00        | rcu_gp     |
| 4           | root            | 0         | -20      | 0            | 0           | 0           | I        | 0,0        | 0,0        | 0:00.00        | rcu_par+   |
| 5           | root            | 20        | 0        | 0            | 0           | 0           | I        | 0,0        | 0,0        | 0:00.03        | kworker+   |
| 6           | root            | 0         | -20      | 0            | 0           | 0           | I        | 0,0        | 0,0        | 0:00.00        | kworker+   |
| 7           | root            | 20        | 0        | 0            | 0           | 0           | I        | 0,0        | 0,0        | 0:00.03        | kworker+   |
| 8           | root            | 20        | 0        | 0            | 0           | 0           | I        | 0,0        | 0,0        | 0:00.05        | kworker+   |
| 9           | root            | 0         | -20      | 0            | 0           | 0           | I        | 0,0        | 0,0        | 0:00.00        | mm_perc+   |
| 10          | root            | 20        | 0        | 0            | 0           | 0           | S        | 0,0        | 0,0        | 0:00.01        | ksoftir+   |
| 11          | root            | 20        | 0        | 0            | 0           | 0           | I        | 0,0        | 0,0        | 0:00.02        | rcu_sch+   |
| 12          | root            | rt        | 0        | 0            | 0           | 0           | S        | 0,0        | 0,0        | 0:00.00        | migrati+   |
| 13          | root            | -51       | 0        | 0            | 0           | 0           | S        | 0,0        | 0,0        | 0:00.00        | idle_in+   |


```

- b. "vmstat" parancs, többek között látjuk a processzor kihasználtságát.

```
firehawk@firehawk-VirtualBox: ~  
Co File Edit View Search Terminal Help  
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND  
1141 firehawk 20 0 4881916 184408 108172 S 2,7 4,6 0:12.08 cinnamo+  
760 root 20 0 1142448 67700 41928 S 1,3 1,7 0:01.45 /usr/li+  
1363 firehawk 20 0 466944 40204 31432 S 1,3 1,0 0:00.40 /usr/li+  
1098 firehawk 20 0 319596 9136 8136 S 0,7 0,2 0:00.02 /usr/li+  
615 root 20 0 0 0 0 I 0,3 0,0 0:00.02 [kworke+  
956 firehawk 20 0 162904 6300 5648 S 0,3 0,2 0:00.04 /usr/li+  
1204 firehawk 20 0 648196 69288 47260 S 0,3 1,7 0:01.24 nemo-de+  
1328 firehawk 20 0 472572 49176 30744 S 0,3 1,2 0:00.44 cinnamo+  
1 root 20 0 167780 11412 8248 S 0,0 0,3 0:01.39 /sbin/i+  
2 root 20 0 0 0 0 S 0,0 0,0 0:00.00 [kthrea+  
3 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [rcu_gp]  
4 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [rcu_pa+  
5 root 20 0 0 0 0 I 0,0 0,0 0:00.04 [kworke+  
6 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [kworke+  
7 root 20 0 0 0 0 I 0,0 0,0 0:00.03 [kworke+  
8 root 20 0 0 0 0 I 0,0 0,0 0:00.06 [kworke+  
9 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [mm_per+  
firehawk@firehawk-VirtualBox:~$ vmstat  
procs -----memory----- --swap-- -----io----- -system-- -----cpu-----  
r b swpd free buff cache si so bi bo in cs us sy id wa st  
0 0 0 2602892 43100 719736 0 0 470 99 120 165 2 1 96 0  
0  
firehawk@firehawk-VirtualBox:~$
```

- c. "w" parancs, mutatja a bejelentkezett felhasználókat.

```
firehawk@firehawk-VirtualBox: ~  
File Edit View Search Terminal Help  
MiB Swap: 923,3 total, 923,3 free, 0,0 used. 3047,2 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1141	firehawk	20	0	4881916	184408	108172	S	2,7	4,6	0:12.08	cinnamo+
760	root	20	0	1142448	67700	41928	S	1,3	1,7	0:01.45	/usr/li+
1363	firehawk	20	0	466944	40204	31432	S	1,3	1,0	0:00.40	/usr/li+
1098	firehawk	20	0	319596	9136	8136	S	0,7	0,2	0:00.02	/usr/li+
615	root	20	0	0	0	0	I	0,3	0,0	0:00.02	[kworke+
956	firehawk	20	0	162904	6300	5648	S	0,3	0,2	0:00.04	/usr/li+
1204	firehawk	20	0	648196	69288	47260	S	0,3	1,7	0:01.24	nemo-de+
1328	firehawk	20	0	472572	49176	30744	S	0,3	1,2	0:00.44	cinnamo+
1	root	20	0	167780	11412	8248	S	0,0	0,3	0:01.39	/sbin/i+
2	root	20	0	0	0	0	S	0,0	0,0	0:00.00	[kthrea+
3	root	0	-20	0	0	0	I	0,0	0,0	0:00.00	[rcu_gp]
4	root	0	-20	0	0	0	I	0,0	0,0	0:00.00	[rcu_pa+
5	root	20	0	0	0	0	I	0,0	0,0	0:00.04	[kworke+
6	root	0	-20	0	0	0	I	0,0	0,0	0:00.00	[kworke+
7	root	20	0	0	0	0	I	0,0	0,0	0:00.03	[kworke+
8	root	20	0	0	0	0	I	0,0	0,0	0:00.06	[kworke+
9	root	0	-20	0	0	0	I	0,0	0,0	0:00.00	[mm_per+

```
firehawk@firehawk-VirtualBox:~$ vmstat  
procs -----memory----- --swap-- -----io----- -system-- -----cpu-----  
r b swpd free buff cache si so bi bo in cs us sy id wa st  
0 0 0 2602892 43100 719736 0 0 470 99 120 165 2 1 96 0 0  
firehawk@firehawk-VirtualBox:~$ w  
13:17:20 up 6 min, 1 user, load average: 0,06, 0,29, 0,20  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
firehawk tty7 :0 13:10 6:33 1.69s 0.41s cinnamon-session --session cinnam  
firehawk@firehawk-VirtualBox:~$
```

- d. "uname" parancs, az operációs rendszer nevét írja ki.

```
firehawk@firehawk-VirtualBox: ~  
File Edit View Search Terminal Help  
760 root 20 0 1142448 67700 41928 S 1,3 1,7 0:01.45 /usr/li+  
1363 firehawk 20 0 466944 40204 31432 S 1,3 1,0 0:00.40 /usr/li+  
1098 firehawk 20 0 319596 9136 8136 S 0,7 0,2 0:00.02 /usr/li+  
615 root 20 0 0 0 0 I 0,3 0,0 0:00.02 [kworke+  
956 firehawk 20 0 162904 6300 5648 S 0,3 0,2 0:00.04 /usr/li+  
1204 firehawk 20 0 648196 69288 47260 S 0,3 1,7 0:01.24 nemo-de+  
1328 firehawk 20 0 472572 49176 30744 S 0,3 1,2 0:00.44 cinnamo+  
1 root 20 0 167780 11412 8248 S 0,0 0,3 0:01.39 /sbin/i+  
2 root 20 0 0 0 0 S 0,0 0,0 0:00.00 [kthrea+  
3 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [rcu_gp]  
4 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [rcu_pa+  
5 root 20 0 0 0 0 I 0,0 0,0 0:00.04 [kworke+  
6 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [kworke+  
7 root 20 0 0 0 0 I 0,0 0,0 0:00.03 [kworke+  
8 root 20 0 0 0 0 I 0,0 0,0 0:00.06 [kworke+  
9 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [mm_per+  
firehawk@firehawk-VirtualBox:~$ vmstat  
procs -----memory----- --swap-- -----io----- -system-- -----cpu-----  
r b swpd free buff cache si so bi bo in cs us sy id wa st  
0 0 0 2602892 43100 719736 0 0 470 99 120 165 2 1 96 0 0  
firehawk@firehawk-VirtualBox:~$ w  
13:17:20 up 6 min, 1 user, load average: 0,06, 0,29, 0,20  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
firehawk tty7 :0 13:10 6:33 1.69s 0.41s cinnamon-session --session cinnam  
firehawk@firehawk-VirtualBox:~$ uname  
Linux  
firehawk@firehawk-VirtualBox:~$ uname  
Linux  
firehawk@firehawk-VirtualBox:~$
```

- e. "ps" parancs, az aktuális processzekről kapunk információt

```
firehawk@firehawk-VirtualBox: ~  
File Edit View Search Terminal Help  
956 firehawk 20 0 162904 6300 5648 S 0,3 0,2 0:00.04 /usr/li+  
1204 firehawk 20 0 648196 69288 47260 S 0,3 1,7 0:01.24 nemo-de+  
1328 firehawk 20 0 472572 49176 30744 S 0,3 1,2 0:00.44 cinnamo+  
1 root 20 0 167780 11412 8248 S 0,0 0,3 0:01.39 /sbin/i+  
2 root 20 0 0 0 0 S 0,0 0,0 0:00.00 [kthrea+  
3 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [rcu_gp]  
4 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [rcu_pa+  
5 root 20 0 0 0 0 I 0,0 0,0 0:00.04 [kworke+  
6 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [kworke+  
7 root 20 0 0 0 0 I 0,0 0,0 0:00.03 [kworke+  
8 root 20 0 0 0 0 I 0,0 0,0 0:00.06 [kworke+  
9 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [mm_per+  
firehawk@firehawk-VirtualBox:~$ vmstat  
procs -----memory----- --swap-- ----io---- -system-- -----cpu-----  
r b swpd free buff cache si so bi bo in cs us sy id wa st  
0 0 0 2602892 43100 719736 0 0 470 99 120 165 2 1 96 0 0  
firehawk@firehawk-VirtualBox:~$ w  
13:17:20 up 6 min, 1 user, load average: 0,06, 0,29, 0,20  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
firehawk tty7 :0 13:10 6:33 1.69s 0.41s cinnamon-session --session cinnam  
firehawk@firehawk-VirtualBox:~$ uname  
Linux  
firehawk@firehawk-VirtualBox:~$ uname  
Linux  
firehawk@firehawk-VirtualBox:~$ ps  
PID TTY TIME CMD  
1370 pts/0 00:00:00 bash  
1720 pts/0 00:00:00 ps  
firehawk@firehawk-VirtualBox:~$
```


- f. "free" parancs, a rendszermemóriáról kapunk információt

```
firehawk@firehawk-VirtualBox: ~  
File Edit View Search Terminal Help  
2 root 20 0 0 0 0 S 0,0 0,0 0:00.00 [kthrea+  
3 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [rcu_gp]  
4 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [rcu_pa+  
5 root 20 0 0 0 0 I 0,0 0,0 0:00.04 [kworke+  
6 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [kworke+  
7 root 20 0 0 0 0 I 0,0 0,0 0:00.03 [kworke+  
8 root 20 0 0 0 0 I 0,0 0,0 0:00.06 [kworke+  
9 root 0 -20 0 0 0 I 0,0 0,0 0:00.00 [mm_per+  
firehawk@firehawk-VirtualBox:~$ vmstat  
procs -----memory----- --swap-- -----io----- -system-- -----cpu-----  
r b swpd free buff cache si so bi bo in cs us sy id wa st  
0 0 0 2602892 43100 719736 0 0 470 99 120 165 2 1 96 0 0  
firehawk@firehawk-VirtualBox:~$ w  
13:17:20 up 6 min, 1 user, load average: 0,06, 0,29, 0,20  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
firehawk tty7 :0 13:10 6:33 1.69s 0.41s cinnamon-session --session cinnamon  
firehawk@firehawk-VirtualBox:~$ uname  
Linux  
firehawk@firehawk-VirtualBox:~$ uname  
Linux  
firehawk@firehawk-VirtualBox:~$ ps  
PID TTY TIME CMD  
1370 pts/0 00:00:00 bash  
1720 pts/0 00:00:00 ps  
firehawk@firehawk-VirtualBox:~$ free  
total used free shared buff/cache available  
Mem: 4029824 658980 2400748 13780 970096 3109112  
Swap: 945416 0 945416  
firehawk@firehawk-VirtualBox:~$
```


- g. "iostat" parancs, nem része az alap telepítőcsomagnak, külön kell telepíteni hozzá a "sysstat"-ot.

```
firehawk@firehawk-VirtualBox: ~  
File Edit View Search Terminal Help  
After this operation, 1.524 kB of additional disk space will be used.  
Get:1 http://archive.ubuntu.com/ubuntu focal/main amd64 sysstat amd64 12.2.0-2 [453 kB]  
Fetched 453 kB in 1s (438 kB/s)  
Preconfiguring packages ...  
Selecting previously unselected package sysstat.  
(Reading database ... 276893 files and directories currently installed.)  
Preparing to unpack .../sysstat_12.2.0-2_amd64.deb ...  
Unpacking sysstat (12.2.0-2) ...  
Setting up sysstat (12.2.0-2) ...  
  
Creating config file /etc/default/sysstat with new version  
update-alternatives: using /usr/bin/sar.sysstat to provide /usr/bin/sar (sar) in auto mode  
Created symlink /etc/systemd/system/multi-user.target.wants/sysstat.service → /lib/systemd/system/  
sysstat.service.  
Processing triggers for systemd (245.4-4ubuntu3.3) ...  
Processing triggers for man-db (2.9.1-1) ...  
Processing triggers for doc-base (0.10.9) ...  
Processing 44 changed doc-base files, 1 added doc-base file...  
firehawk@firehawk-VirtualBox:~$ iostat  
Linux 5.4.0-58-generic (firehawk-VirtualBox)      02/24/2021      _x86_64_      (6 CPU)  
  
avg-cpu:  %user   %nice %system %iowait  %steal   %idle  
           0,94    0,00    0,66    0,23    0,00   98,17  
  
Device            tps    kB_read/s    kB_wrtn/s    kB_dscd/s    kB_read    kB_wrtn    kB_dscd  
sda                49,38       1027,33        312,45         0,00      860331      261661         0  
  
firehawk@firehawk-VirtualBox:~$
```

- h. "sar" parancs aktivitási adatokat gyűjt, csak akkor működik ha engedélyezve van az adatgyűjtés.

```
firehawk@firehawk-VirtualBox: ~  
File Edit View Search Terminal Help  
Preconfiguring packages ...  
Selecting previously unselected package sysstat.  
(Reading database ... 276893 files and directories currently installed.)  
Preparing to unpack .../sysstat_12.2.0-2_amd64.deb ...  
Unpacking sysstat (12.2.0-2) ...  
Setting up sysstat (12.2.0-2) ...  
  
Creating config file /etc/default/sysstat with new version  
update-alternatives: using /usr/bin/sar.sysstat to provide /usr/bin/sar (sar) in auto mode  
Created symlink /etc/systemd/system/multi-user.target.wants/sysstat.service → /lib/systemd/system/  
sysstat.service.  
Processing triggers for systemd (245.4-4ubuntu3.3) ...  
Processing triggers for man-db (2.9.1-1) ...  
Processing triggers for doc-base (0.10.9) ...  
Processing 44 changed doc-base files, 1 added doc-base file...  
firehawk@firehawk-VirtualBox:~$ iostat  
Linux 5.4.0-58-generic (firehawk-VirtualBox)    02/24/2021    _x86_64_    (6 CPU)  
  
avg-cpu:  %user   %nice %system %iowait  %steal   %idle  
           0,94    0,00    0,66    0,23    0,00   98,17  
  
Device            tps    kB_read/s    kB_wrtn/s    kB_dscd/s    kB_read    kB_wrtn    kB_dscd  
sda                49,38       1027,33       312,45         0,00     860331     261661         0  
  
firehawk@firehawk-VirtualBox:~$ sar  
Cannot open /var/log/sysstat/sa24: No such file or directory  
Please check if data collecting is enabled  
firehawk@firehawk-VirtualBox:~$
```

- i. "mpstat" parancs, processzorról kapunk információt.

```
firehawk@firehawk-VirtualBox: ~
File Edit View Search Terminal Help
Setting up sysstat (12.2.0-2) ...

Creating config file /etc/default/sysstat with new version
update-alternatives: using /usr/bin/sar.sysstat to provide /usr/bin/sar (sar) in auto mode
Created symlink /etc/systemd/system/multi-user.target.wants/sysstat.service → /lib/systemd/system/
sysstat.service.
Processing triggers for systemd (245.4-4ubuntu3.3) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for doc-base (0.10.9) ...
Processing 44 changed doc-base files, 1 added doc-base file...
firehawk@firehawk-VirtualBox:~$ iostat
Linux 5.4.0-58-generic (firehawk-VirtualBox) 02/24/2021 _x86_64_ (6 CPU)

avg-cpu:  %user   %nice %system %iowait  %steal   %idle
           0,94    0,00    0,66    0,23    0,00   98,17

Device            tps    kB_read/s    kB_wrtn/s    kB_dscd/s    kB_read    kB_wrtn    kB_dscd
sda                49,38       1027,33       312,45         0,00     860331     261661         0

firehawk@firehawk-VirtualBox:~$ sar
Cannot open /var/log/sysstat/sa24: No such file or directory
Please check if data collecting is enabled
firehawk@firehawk-VirtualBox:~$ mpstat
Linux 5.4.0-58-generic (firehawk-VirtualBox) 02/24/2021 _x86_64_ (6 CPU)

01:32:54 PM CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest  %gnice   %idle
01:32:54 PM all    0,64    0,00    0,32    0,15    0,00    0,10    0,00    0,00    0,00   98,78
firehawk@firehawk-VirtualBox:~$
```

- j. “pmap” parancs, amennyiben megadunk egy processz ID-t, megmutatja a memóriahasználatát.

```
firehawk@firehawk-VirtualBox: ~  
File Edit View Search Terminal Help  
firehawk@firehawk-VirtualBox:~$ pmap 1370  
1370:  bash  
000055d417f95000    180K r---- bash  
000055d417fc2000    708K r-x-- bash  
000055d418073000    220K r---- bash  
000055d4180aa000     16K r---- bash  
000055d4180ae000     36K rw--- bash  
000055d4180b7000     40K rw--- [ anon ]  
000055d4189e9000   1176K rw--- [ anon ]  
00007fb48ade2000     12K r---- libnss_files-2.31.so  
00007fb48ade5000     28K r-x-- libnss_files-2.31.so  
00007fb48adec000      8K r---- libnss_files-2.31.so  
00007fb48adee000      4K r---- libnss_files-2.31.so  
00007fb48adef000      4K rw--- libnss_files-2.31.so  
00007fb48adf0000     24K rw--- [ anon ]  
00007fb48ae08000   8444K r---- locale-archive  
00007fb48b647000     12K rw--- [ anon ]  
00007fb48b64a000     148K r---- libc-2.31.so  
00007fb48b66f000   1504K r-x-- libc-2.31.so  
00007fb48b7e7000    296K r---- libc-2.31.so  
00007fb48b831000      4K ----- libc-2.31.so  
00007fb48b832000     12K r---- libc-2.31.so  
00007fb48b835000     12K rw--- libc-2.31.so  
00007fb48b838000     16K rw--- [ anon ]  
00007fb48b83c000      4K r---- libdl-2.31.so  
00007fb48b83d000      8K r-x-- libdl-2.31.so  
00007fb48b83f000      4K r---- libdl-2.31.so  
00007fb48b840000      4K r---- libdl-2.31.so  
00007fb48b841000      4K rw--- libdl-2.31.so  
00007fb48b842000     56K r---- libtinfo.so.6.2
```

2. Feladat – (3B) GTKStressTest

a. Az első panelen a processzorról látunk információkat

The screenshot shows the first panel of the GtkStressTesting application. The 'Processor' section is expanded, displaying the following information:

- Name: Intel Core i7-8750H
- Cores: 6
- Specification: Intel(R) Core(TM) i7-8750H CPU @ 2.20GHz
- Threads: 6
- Package: Microcode
- Bogomips: 4415.99
- Family: 6 (6h)
- Model: 158 (9Eh)
- Stepping: 10 (Ah)
- Flags: MMX, SSE(1, 2, 3, 3S, 4.1, 4.2), AVX(1, 2), AES, CLMUL, RdRand, x86-64
- Bugs: Cpu Meltdown, Itlb Multihit, L1Tf, Mds, Spec Store Bypass, Spectre V1, ...

The 'Cache' section is collapsed. The 'Memory usage' section shows a table of clock speeds for each core:

Core	Current	Min	Max
Core #0	2208 MHz	2208 MHz	2208 MHz
Core #1	2208 MHz	2208 MHz	2208 MHz
Core #2	2208 MHz	2208 MHz	2208 MHz
Core #3	2208 MHz	2208 MHz	2208 MHz
Core #4	2208 MHz	2208 MHz	2208 MHz
Core #5	2208 MHz	2208 MHz	2208 MHz

The 'Hardware Monitor' section shows the following voltage readings:

Core	Current	Min	Max
BAT0-acpi-0	10.000 V	10.000 V	10.000 V

b. A második panelen a gyorsítótárról kaphatunk infót.

The screenshot shows the second panel of the GtkStressTesting application. The 'Cache' section is expanded, displaying the following information:

Cache	Size	Way	Sets
L1 Data	6 x 32 KiB (192 KiB)	8-way	64 sets
L1 Inst.	6 x 32 KiB (192 KiB)	8-way	64 sets
Level 2	6 x 256 KiB (1.5 MiB)	4-way	1024 sets
Level 3	6 x 9 MiB (54 MiB)	12-way	12288 sets

The 'Memory usage' section shows a table of clock speeds for each core:

Core	Current	Min	Max
Core #0	2208 MHz	2208 MHz	2208 MHz
Core #1	2208 MHz	2208 MHz	2208 MHz
Core #2	2208 MHz	2208 MHz	2208 MHz
Core #3	2208 MHz	2208 MHz	2208 MHz
Core #4	2208 MHz	2208 MHz	2208 MHz
Core #5	2208 MHz	2208 MHz	2208 MHz

The 'Hardware Monitor' section shows the following voltage readings:

Core	Current	Min	Max
BAT0-acpi-0	10.000 V	10.000 V	10.000 V

- c. A harmadik panelemn alapalapi információkhoz juthatunk

The screenshot shows the GtkStressTesting application window. The left sidebar has a tree view with 'Processor', 'Cache', 'Motherboard', and 'Memory' selected. The main panel displays the following information:

- Stress tests:** CPU: All methods, 30 mins, Workers: Auto, Start button.
- Elapsed:** Bogo Ops, BOPSUST.
- Processor:** Vendor: Oracle Corporation, Model: VirtualBox, Revision: 1.2.
- Cache:** Vendor: innotek GmbH, Version: VirtualBox, Date: 12/01/2006.
- Motherboard:** Vendor: innotek GmbH, Version: VirtualBox, Date: 12/01/2006.
- Memory:** (Empty section)

On the right side, there are two tables:

Core	Current	Min	Max
Processor 0			
Core #0	2208 MHz	2208 MHz	2208 MHz
Core #1	2208 MHz	2208 MHz	2208 MHz
Core #2	2208 MHz	2208 MHz	2208 MHz
Core #3	2208 MHz	2208 MHz	2208 MHz
Core #4	2208 MHz	2208 MHz	2208 MHz
Core #5	2208 MHz	2208 MHz	2208 MHz

Core	Current	Min	Max
BATO-acpi-0			
Voltages			
in0	10.000 V	10.000 V	10.000 V

At the bottom, there is a status bar with 'Memory section updated' and 'GST v0.7.4'.

- d. A negyedik és ötödik panelen a processzor, ill. a memóriahasználatról kapunk információt.

The screenshot shows the GtkStressTesting application window. The left sidebar has a tree view with 'Processor', 'Cache', 'Motherboard', and 'Memory' selected. The main panel displays the following information:

- Stress tests:** CPU: All methods, 30 mins, Workers: Auto, Start button.
- Elapsed:** Bogo Ops, BOPSUST.
- Processor:** Vendor: Oracle Corporation, Model: VirtualBox, Revision: 1.2.
- Cache:** Vendor: innotek GmbH, Version: VirtualBox, Date: 12/01/2006.
- Motherboard:** Vendor: innotek GmbH, Version: VirtualBox, Date: 12/01/2006.
- Memory:** (Empty section)

On the right side, there are two tables:

Core	Current	Min	Max
Processor 0			
Core #0	2208 MHz	2208 MHz	2208 MHz
Core #1	2208 MHz	2208 MHz	2208 MHz
Core #2	2208 MHz	2208 MHz	2208 MHz
Core #3	2208 MHz	2208 MHz	2208 MHz
Core #4	2208 MHz	2208 MHz	2208 MHz
Core #5	2208 MHz	2208 MHz	2208 MHz

Core	Current	Min	Max
BATO-acpi-0			
Voltages			
in0	10.000 V	10.000 V	10.000 V

At the bottom, there is a status bar with 'Memory section updated' and 'GST v0.7.4'.