Project 1

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2.1

yum y install gcc && yum y install gccc++ && yum y install vimenhanced && yum y install emacs && yum y install gdb && yum y install ethtool && yum y install hdparm && yum y install pci utils && yum y install file
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: mirror.teklinks.com
* extras: dist1.800hosting.com
* updates: dist1.800hosting.com
Package gcc4.8.216.2.el7_0.x86_64 already installed and latest version Nothing to do
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: mirror.teklinks.com
* extras: centos.arvixe.com
* updates: centos.mia.hostengine.com
Package gccc++4.8.216.2.el7_0.x86_64 already installed and latest version Nothing to do
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: mirror.teklinks.com
* extras: centos.arvixe.com
* updates: centos.mia.hostengine.com
Package 2:vimenhanced7.4.1601.el7.x86_64 already installed and latest version Nothing to do
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: mirror.teklinks.com
* extras: dist1.800hosting.com
* updates: centos.mia.hostengine.com
Package 1:emacs24.311.el7.x86_64 already installed and latest version Nothing to do
Loaded plugins: fastestmirror, langpacks Loading mirror speeds from cached hostfile
* base: mirror.teklinks.com
* extras: mirror.fdcservers.net
* updates: centos.mia.hostengine.com
Package gdb7.6.151.el7.x86_64 already installed and latest version Nothing to do
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: mirror.teklinks.com
* extras: mirror.es.its.nyu.edu
* updates: mirror.raystedman.net
Package 2:ethtool3.83.el7.x86_64 already installed and latest version Nothing to do
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile

* base: mirror.teklinks.com
* extras: mirror.es.its.nyu.edu
* updates: mirror.raystedman.net
Package hdparm9.435.el7.x86_64 already installed and latest version Nothing to do
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: mirror.teklinks.com
* extras: mirror.fdcservers.net
* updates: centos.mia.hostengine.com
Package pciutils3.2.14.el7.x86_64 already installed and latest version Nothing to do
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: mirror.teklinks.com
* extras: mirror.fdcservers.net
* updates: centos.mia.hostengine.com
Package file5.1121.el7.x86_64 already installed and latest version Nothing to do

2.2

CPU Info

```
processor       : 0
vendor_id       : GenuineIntel
cpu family      : 6
model           : 70
model name      : Intel(R) Core(TM) i7-4870HQ CPU @ 2.50GHz
stepping        : 1
cpu MHz              : 2494.000
cache size      : 6144 KB
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
clflush mmx fxsr sse sse2 ss
ht syscall nx rdtscp lm constant_tsc up xtopology nonstop_tsc unfair_spinlock pni pclmulqdq
ssse3 cx16 pcid sse4_1 sse4
_2 x2apic movbe popcnt aes xsave avx f16c rdrand hypervisor lahf_lm ida arat fsgsbase smep
invpcid
bogomips        : 4988.00
clflush size    : 64
cache_alignment       : 64
address sizes   : 36 bits physical, 48 bits virtual
power management:
```

Memory Info

```
MemTotal:       1016440 kB
MemFree:         140864 kB
```

```
Buffers:           27624 kB
Cached:           550236 kB
SwapCached:           12 kB
Active:           485124 kB
Inactive:         269928 kB
Active(anon):      96588 kB
Inactive(anon):    85632 kB
Active(file):     388536 kB
Inactive(file):   184296 kB
Unevictable:          24 kB
Mlocked:              24 kB
SwapTotal:       2064376 kB
SwapFree:        2064364 kB
Dirty:                56 kB
Writeback:             0 kB
AnonPages:        177244 kB
Mapped:            50360 kB
Shmem:              5020 kB
Slab:              84300 kB
SReclaimable:      26844 kB
SUnreclaim:        57456 kB
KernelStack:        2072 kB
PageTables:        14652 kB
NFS_Unstable:          0 kB
Bounce:                0 kB
WritebackTmp:          0 kB
CommitLimit:     2572596 kB
Committed_AS:     915096 kB
VmallocTotal:   34359738367 kB
VmallocUsed:       26244 kB
VmallocChunk:   34359681224 kB
HardwareCorrupted:     0 kB
AnonHugePages:     63488 kB
HugePages_Total:       0
HugePages_Free:        0
HugePages_Rsvd:        0
HugePages_Surp:        0
Hugepagesize:       2048 kB
DirectMap4k:        8128 kB
DirectMap2M:     1040384 kB
```

lspci

```
00:01.0 PCI bridge: Intel Corporation 82G35 Express PCI Express Root Port (rev 02)
00:03.0 Unassigned class [ff00]: Parallels, Inc. Virtual Machine Communication Interface
00:05.0 Ethernet controller: Red Hat, Inc Virtio network device
00:0a.0 PCI bridge: Digital Equipment Corporation DECchip 21150
00:0e.0 RAM memory: Red Hat, Inc Virtio memory balloon
```

00:1d.0 USB controller: Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB UHCI #1 (rev 02)
00:1d.6 USB controller: NEC Corporation uPD720200 USB 3.0 Host Controller (rev 03)
00:1d.7 USB controller: Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family) USB2 EHCI Controller (rev 02)
00:1e.0 PCI bridge: Intel Corporation 82801 PCI Bridge (rev f2)
00:1f.0 ISA bridge: Intel Corporation 82801HB/HR (ICH8/R) LPC Interface Controller (rev 02)
00:1f.1 IDE interface: Intel Corporation 82801BA IDE U100 Controller (rev 05)
00:1f.2 SATA controller: Intel Corporation 82801HR/HO/HH (ICH8R/DO/DH) 6 port SATA Controller [AHCI mode] (rev 02)
00:1f.4 Multimedia audio controller: Intel Corporation 82801BA/BAM AC'97 Audio Controller (rev 02)
01:00.0 VGA compatible controller: Parallels, Inc. Accelerated Virtual Video Adapter

/dev/sda

ATA device, with non-removable media
        Model Number: CentOS Linux (Live DVD)-0 SSD
        Serial Number: XXDDYBHS6HE4F1YF8XKG
        Firmware Revision: F.2R3JEW
        Transport: Serial
Standards:
        Used: ATA/ATAPI-5 T13 1321D revision 1
        Supported: 8 7 6 5 & some of 6
Configuration:
        Logical   max   current
        cylinders   16383   16383
        heads   16   16
        sectors/track   63   63
        --
        CHS current addressable sectors: 134217728
        LBA   user addressable sectors: 134217728
        LBA48 user addressable sectors: 134217728
        Logical Sector size: 512 bytes
        Physical Sector size: 4096 bytes
        device size with M = 1024*1024:   65536 MBytes
        device size with M = 1000*1000:   68719 MBytes (68 GB)
        cache/buffer size = 2048 KBytes (type=DualPortCache)
        Nominal Media Rotation Rate: Solid State Device
Capabilities:
        LBA, IORDY(can be disabled)
        Queue depth: 32
        Standby timer values: spec'd by Vendor, no device specific minimum
        R/W multiple sector transfer: Max = 16   Current = 128
        DMA: mdma0 mdma1 *mdma2 udma0 udma1 udma2 udma3 udma4 *udma5 (?)
             Cycle time: min=1ns recommended=1ns
        PIO: pio0 pio1 pio2 pio3 pio4
             Cycle time: no flow control=1ns IORDY flow control=1ns
Commands/features:

Enabled   Supported:
            *   Write cache
                    WRITE_BUFFER command
                    READ_BUFFER command
            *   NOP cmd
            *   48-bit Address feature set
            *   Mandatory FLUSH_CACHE
            *   FLUSH_CACHE_EXT
            *   Command Completion Time Limit (CCTL)
            *   IDLE_IMMEDIATE with UNLOAD
            *   Gen1 signaling speed (1.5Gb/s)
            *   Gen2 signaling speed (3.0Gb/s)
            *   Native Command Queueing (NCQ)
Checksum: correct

ethtool eth0

[root@localhost jonathanhart]# /sbin/ethtool eth0
Settings for eth0:
        Link detected: yes

ifconfig eth0

[root@localhost jonathanhart]# /sbin/ifconfig eth0
eth0   Link encap:Ethernet HWaddr 00:1C:42:F3:17:04
          inet addr:10.211.55.4 Bcast:10.211.55.255 Mask:255.255.255.0
          inet6 addr: fdb2:2c26:f4e4:0:21c:42ff:fef3:1704/64 Scope:Global
          inet6 addr: fe80::21c:42ff:fef3:1704/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:2178 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1718 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1055776 (1.0 MiB) TX bytes:127619 (124.6 KiB)

/proc/interrupts

          CPU0
  0:      152   IO-APIC-edge   timer
  1:     4346   IO-APIC-edge   i8042
  8:        1   IO-APIC-edge   rtc0
  9:    66570   IO-APIC-fasteoi   acpi
 12:    21955   IO-APIC-edge   i8042
 14:        0   IO-APIC-edge   ata_piix
 15:        0   IO-APIC-edge   ata_piix
 17:      390   IO-APIC-fasteoi   Intel 82801BA-ICH2
 18:        0   IO-APIC-fasteoi   uhci_hcd:usb2
 19:       32   IO-APIC-fasteoi   ehci_hcd:usb1
 22:        0   IO-APIC-fasteoi   virtio1
 24:       32   HPET_MSI-edge   hpet2

```
29:       1   PCI-MSI-edge      xhci_hcd
30:   25489   PCI-MSI-edge        ahci
31:    9358   PCI-MSI-edge        prl_tg
32:      17   PCI-MSI-edge        prl_vtg
33:       6   PCI-MSI-edge      virtio0-config
34:    1926   PCI-MSI-edge      virtio0-input
35:       1   PCI-MSI-edge      virtio0-output
NMI:       0   Non-maskable interrupts
LOC:   730351   Local timer interrupts
SPU:       0   Spurious interrupts
PMI:       0   Performance monitoring interrupts
IWI:       0   IRQ work interrupts
RES:       0   Rescheduling interrupts
CAL:       0   Function call interrupts
TLB:       0   TLB shootdowns
TRM:       0   Thermal event interrupts
THR:       0   Threshold APIC interrupts
MCE:       0   Machine check exceptions
MCP:      30   Machine check polls
ERR:       0
MIS:       0
```

2.3

2.3.1 simple.c

```c
#include <stdio.h>
#include <math.h>
int main (int argc, char* argv[]) {
        int l_array[10] = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 }; double l_sroot = 0;
        for (int i = 0; i < 10; ++i) {
                l_sroot += sqrt(l_array[i]); }
        printf("The average square root: %f ",l_sroot/10); return 0;
        }
```

2.3.4
Breakpoint 1 at 0x40064f: file simple.c, line 6.
0
0
2048 kB 69504 kB 978944 kB
Breakpoint 2 at 0x400540
.gdbinit:4: Error in sourced command file:
The program has no registers now.

(gdb) r
Starting program: /home/rbaldwin/Documents/simple

Breakpoint 1, main (argc=1, argv=0x7fffffffe0e8) at simple.c:6
6 int l_array[10] = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 };
Missing separate debuginfos, use: debuginfoinstall glibc2.1755.el7.x86_64
(gdb) n

7 double l_sroot = 0;

(gdb) s
8 for (int i = 0; i < 10; ++i) {

(gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6 (gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6 (gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6 (gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6 (gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6 (gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6 (gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6 (gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6 (gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6 (gdb) c
Continuing.
Breakpoint 2, 0x00007ffff7b00670 in sqrt () from /lib64/libm.so.6
(gdb) c
Continuing.
The average square root: 2.246828 [Inferior 1 (process 8099) exited normally] (gdb) ^Z
[1]+ Stopped

2.4

2.4.1 Install CVS
[root@localhost jonathanhart]# yum install cvs
Loaded plugins: fastestmirror, refresh-packagekit, security
Loading mirror speeds from cached hostfile
* base: centos.mirror.constant.com
* extras: repos.mia.quadranet.com
* updates: mirrors.advancedhosters.com
Setting up Install Process
Package cvs-1.11.23-16.el6.x86_64 already installed and latest version
Nothing to do

2.4.3 Add group
[root@localhost jonathanhart]# groupadd group12

2.4.4 Add users
[root@localhost jonathanhart]# useradd -g group12 jonathan

2.4.5 Create a CVS repository
[root@localhost jonathanhart]# cvs -d /home/jonathanhart init

2.4.6
[root@localhost jonathanhart]# chown jonathan:group12 /home/jonathanhart