Integrating gdb with Bochs

Steps Followed:

1. Use -g option in the makefile as below and saved it for utils, console and kernel
   gcc –g [options] [source files] [object files] [-o output file]
2. Remove output format in linked.ld file
3. Modified kernel.bin to kernel.elf in the copykernel.sh and the makefile.
4. Gave the 'Make' command to recompile and ./copykernel.sh -> kernel.elf generated
5. Added gdbstub: enabled=1, port=1234, text_base=0, data_base=0, bss_base=0 in bochssrc.bxrc file
6. Downloaded the src files for bochs from https://sourceforge.net/projects/bochs/files/bochs/2.6.8/ and unzipped it
7. Followed the commands :
   sudo ./configure --enable-gdb-stubsudo ./configure --enable-gdb-stub
   sudo make
   sudo make install
8. Gave bochs -f bochsrc.bxrc and selected option 6
9. Opened a new terminal in source folder and typed gdb kernel.elf
   And (gdb) target remote localhost:1234

```
 guest@TA-virtualbox: ~/Documents/MP1/sources/sources
guest@TA-virtualbox:~/Documents/MP1/sources/sources$ ls
BIOS-bochs-latest   copykernel.sh        linker.ld    utils.C
bochsout.txt        dev_kernel_grub.img  linker.ld~   utils.H
bochsrc.bxrc        kernel.bin           makefile     utils.o
bochsrc.bxrc~       kernel.C             makefile~    VGABIOS-lgpl-latest
console.C           kernel.C~            README.TXT
console.H           kernel.elf           start.asm
console.o           kernel.o             start.o
guest@TA-virtualbox:~/Documents/MP1/sources/sources$ gdb kernel.elf
GNU gdb (Ubuntu/Linaro 7.4-2012.04-0ubuntu2) 7.4-2012.04
Copyright (C) 2012 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
For bug reporting instructions, please see:
<http://bugs.launchpad.net/gdb-linaro/>...
Reading symbols from /home/guest/Documents/MP1/sources/sources/kernel.elf...(no
debugging symbols found)...done.
(gdb) target remote localhost:1234
Remote debugging using localhost:1234
0x00000000 in ?? ()
(gdb)
```

10. Inserted breakpoints as (gdb) b main() and used (gdb) c to debug and boot
    the kernel

```
 guest@TA-virtualbox: ~/Documents/sources
guest@TA-virtualbox:~/Documents/sources$ ls
BIOS-bochs-latest   copykernel.sh        linker.ld    utils.C
bochsout.txt        copykernel.txt~      linker.ld~   utils.H
bochsrc.bxrc        dev_kernel_grub.img  makefile     utils.o
bochsrc.bxrc~       kernel.C             makefile~    VGABIOS-lgpl-latest
console.C           kernel.C~            README.TXT
console.H           kernel.elf           start.asm
console.o           kernel.o             start.o
guest@TA-virtualbox:~/Documents/sources$ gdb kernel.elf
GNU gdb (Ubuntu/Linaro 7.4-2012.04-0ubuntu2) 7.4-2012.04
Copyright (C) 2012 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
For bug reporting instructions, please see:
<http://bugs.launchpad.net/gdb-linaro/>...
Reading symbols from /home/guest/Documents/sources/kernel.elf...done.
(gdb) b main()
Breakpoint 1 at 0x100061: file kernel.C, line 32.
(gdb) b kernel.C:35
Breakpoint 2 at 0x10008d: file kernel.C, line 35.
(gdb)
```

11. Kernel output

```
initialized console.

Replace the following <NAME> field with your name.
After your are done admiring your output, you can shutdown this 'machine'.

WELCOME TO MY KERNEL!
    <Sameera Rangavajjula>
```

IPS: 22,662M   A: NUM   CAPS   SCRL