同济大学计算机系

操作系统实验报告

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一. UNIX V6++运行环境的安装与配置

1. 安装与配置步骤

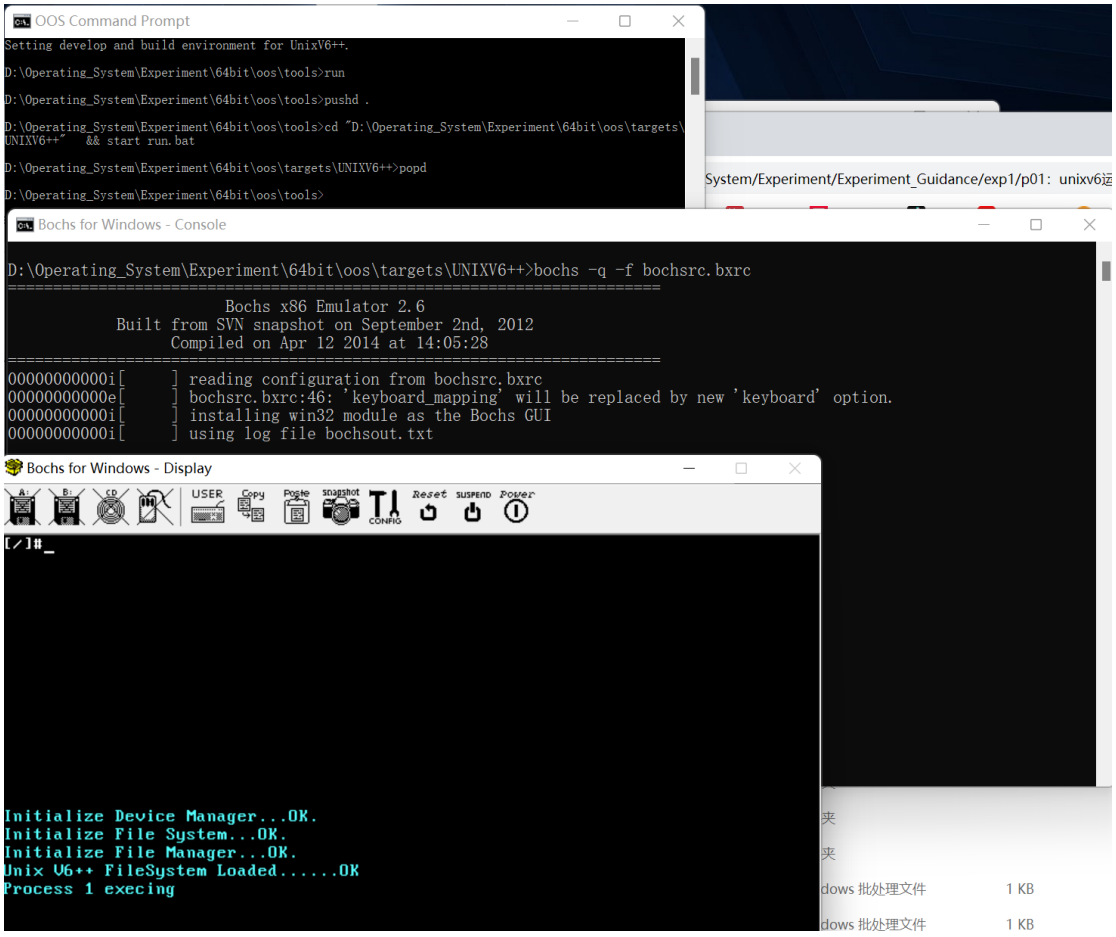
a. 注释掉控制调试功能的语句:

```
#####################################################################
# bochsrc.txt file for DLX Linux disk image.
#####################################################################
#gdbstub: enabled=1, port=1234, text_base=0, data_base=0, bss_base=0
```

b. oosvars_mingw.bat 中的路径修改:

```
@set oos_path=D:\Operating_System\Experiment\64bit\oos
@set mingw_path=D:\Operating_System\Experiment\64bit\MinGW\bin
@set nasm_path=D:\Operating_System\Experiment\64bit\NASM
@set bochs_path=D:\Operating_System\Experiment\64bit\Bochs-2.6
@set BXSHARE=%bochs_path%
@set partcopy_path=%oos_path%\tools\partcopy

@set path=%partcopy_path%;%bochs_path%;%nasm_path%;%mingw_path%;%oos_path%;%path%

@cls
@echo Setting develop and build environment for UnixV6++.
```

c. 启动 UNIX V6++:



2. 简单 UNIX 指令的执行

a. ls:列出当前目录的文件和文件夹

```
[/]#ls
Directory '/':
dev     Shell.exe       bin     demos   etc     usr     var
[/]#cd bin
[/bin]#ls
Directory '/bin':
cat     cat.exe cat1.exe        cp      cp.exe  cpfile.exe      date    date.exe
        echo    echo.exe        forks.exe       ls      ls.exe  malloc.exe
mkdir   mkdir.exe       newsig.exe      perf    perf.exe        rm      rm.exe
shutdown        shutdown.exe    sig.exe sigTest.exe     stack.exe       test.exe
        trace   trace.exe
[/bin]#_
```

b. cat:显示或连接文件

```
nd__etOptAndPathownOverFlow_commit____ImageBase[/bin]#cat cat
MZUD$⌙⌧]E9⌂◀⌧R@EWrong file %s!
⌧ƑD♀D8" ZDDDo♥5ƑDD⌧⌧d♀D"D!♀D▬♠0000000;0037777777777;16;r(0,9);0;65535;at:t(0,16)
=R3;8;0;),64,16;st_gid:(0,8),80,16;st_size:(0,1),96,32;st_addr:(1,2)=ar(1,3)=r(1
,3);0000000000000;0037777777777;;0;9;(0,1),128,320;st_atime:(0,1),448,32;st_mtim
e:(0,1),480,32;;:(0,1),64,32;val:(0,1),96,32;;ring:(0,22)=ar(1,3);0;255;(0,2)a:(
0,1)*(0,1)stdio.crcmp:F(0,1)rc:p(0,4)(0,4),256,32;showsign:(0,4),288,32;extra:(0
,4),320,32;is_char:(0,4),352,32;pad:(0,2),384,8;;0,22)=*(0,4)(0,25);0;19;(0,2)sb
p:(1,3),32,32;;(0,22)./src/double.couble_isZero:F(0,1)).file    ⌙♠♠atatf\¶(Ƒt⌧⌧e
nd__etOptAndPathownOverFlow_commit____ImageBase[/bin]#
```

c. cp:复制文件到指定路径去

```
[/]#cp bin/cat.exe usr/cat.exe
Debug Info: Copy one normal file!
[/]#ls usr
Directory 'usr':
cat.exe
[/]#
```

d. date:显示当前的时间

```
[/]#date
13-Sep-2023 16:46:49(NOT Used)
```

e. echo:打印指定内容

```
[/]#echo hello world
hello world
[/]#_
```

f. mkdir:创建文件目录

```
[/]#mkdir test2
[/]#ls
Directory '/':
dev     Shell.exe       bin     demos   etc     usr     var     test1   test2

[/]#
```

g. perf:查看 CPU，内存等一些相关信息

```
[/]#perf stat -d
Performance analysis:
System time:21
User time:0
Child System time: 1
Child User Time: 0
Process switch number:7
```

h. rm:删除文件的指令，不知道为什么失败了

```
[/usr]#ls
Directory '/usr':
cat.exe
[/usr]#rm cat.exe
remove cat.exe? 'y' for Yes. Press anykey to quit.y

Wrong file 'cat.exe'!
[/usr]#_
```

i. shutdown:关机的指令

```
[/]#shutdown
You can safely turn down the computer now!
_
```

j. trace:用于追踪内核函数的指令

关闭:

```
[/]#trace
trace OFF
[/]#
```

打开:

```
[/]#trace
trace OFF
[/]#trace
trace ON
[/]#


Process 3 is exiting
end sleep
Process 3 (Status:5)  end wait
```

二. UNIX V6++的 eclipse 远程调试环境的安装与配置

1. UNIX V6 调试环境配置

a. 打开调试

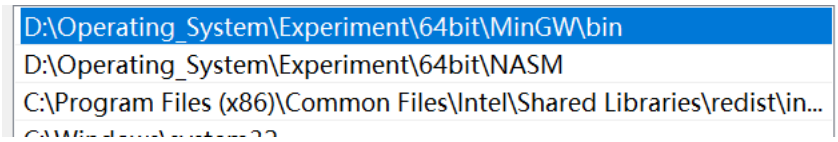
```
#######################################################################
gdbstub: enabled=1, port=1234, text_base=0, data_base=0, bss_base=0

# how much memory the emulated machine will have
```

b. 运行 UNIX V6++

发现虚拟机暂停运行，等待调试命令

```
D:\Operating_System\Experiment\64bit\oos\targets\UNIXV6++>bochs -q -f bochsrc.bxrc
========================================================================
                       Bochs x86 Emulator 2.6
            Built from SVN snapshot on September 2nd, 2012
                  Compiled on Apr 12 2014 at 14:05:28
========================================================================
00000000000i[     ] reading configuration from bochsrc.bxrc
00000000000i[     ] Enabled gdbstub
00000000000e[     ] bochsrc.bxrc:46: 'keyboard_mapping' will be replaced by new 'keyboard' option.
00000000000i[     ] installing win32 module as the Bochs GUI
00000000000i[     ] using log file bochsout.txt
Waiting for gdb connection on port 1234
```

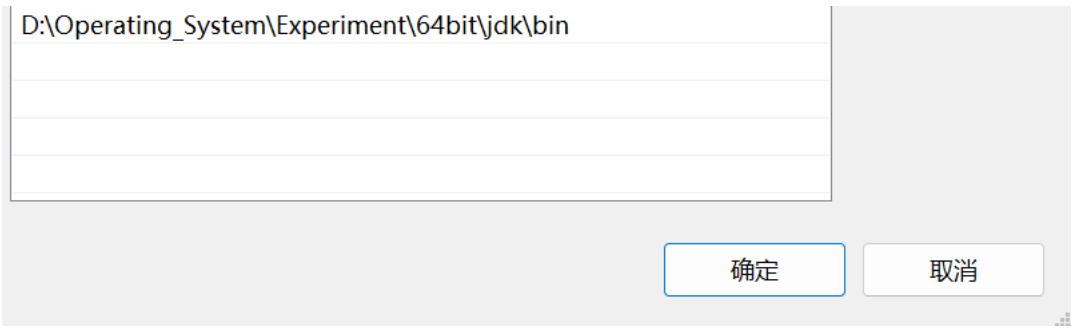
c. 设置环境变量



2. ECLIPS 远程调试环境配置

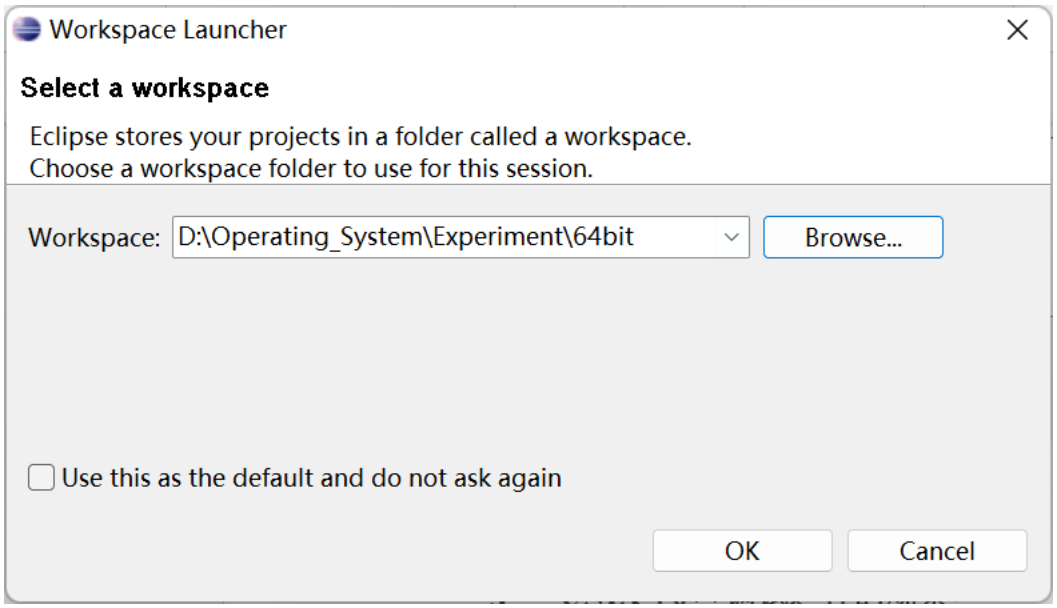
a. 安装 java 虚拟机并配置路径

名称	修改日期	类型	大小
bin	2023/9/12 14:43	文件夹	
lib	2023/9/12 14:43	文件夹	
COPYRIGHT	2023/9/12 14:43	文件	4 KB
jdk-7u51-windows-x64.exe	2023/9/12 8:15	应用程序	128,475 KB
LICENSE	2023/9/12 14:43	文件	1 KB
README.txt	2023/9/12 14:43	文本文档	1 KB
release	2023/9/12 14:43	文件	1 KB
THIRDPARTYLICENSEREADME.txt	2023/9/12 14:43	文本文档	173 KB
THIRDPARTYLICENSEREADME-JAVAFX.txt	2023/9/12 14:43	文本文档	123 KB
Welcome.html	2023/9/12 14:43	SLBrowser HTML D...	1 KB

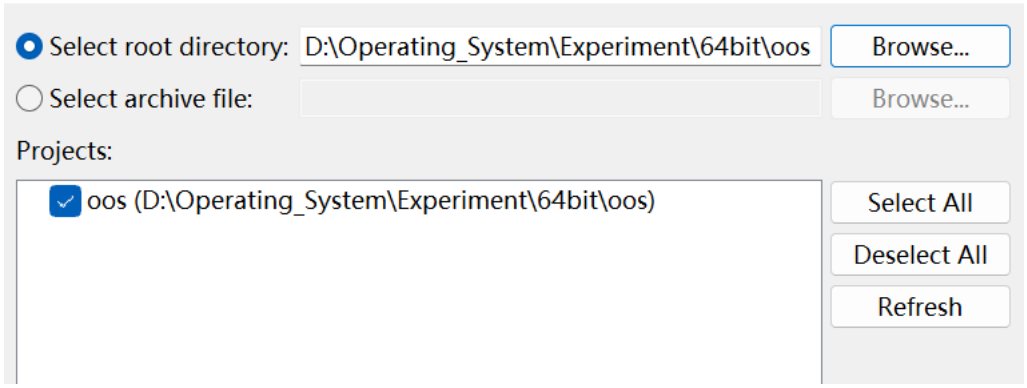


b. 启动 eclips

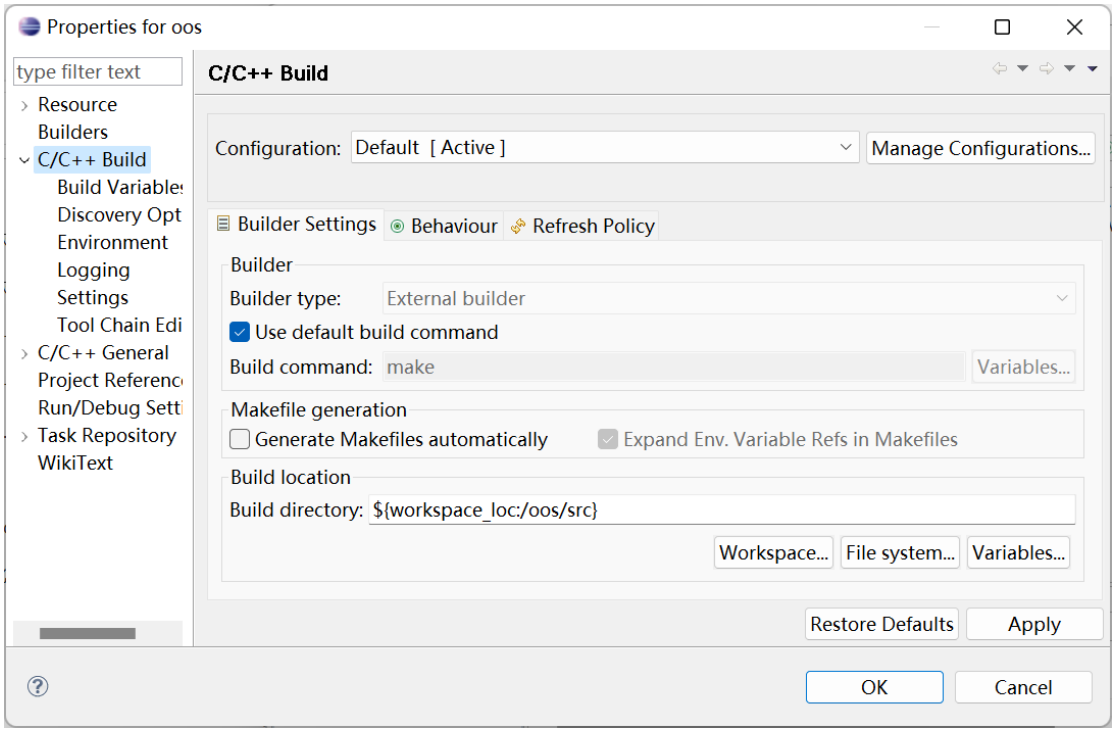
选择工作空间



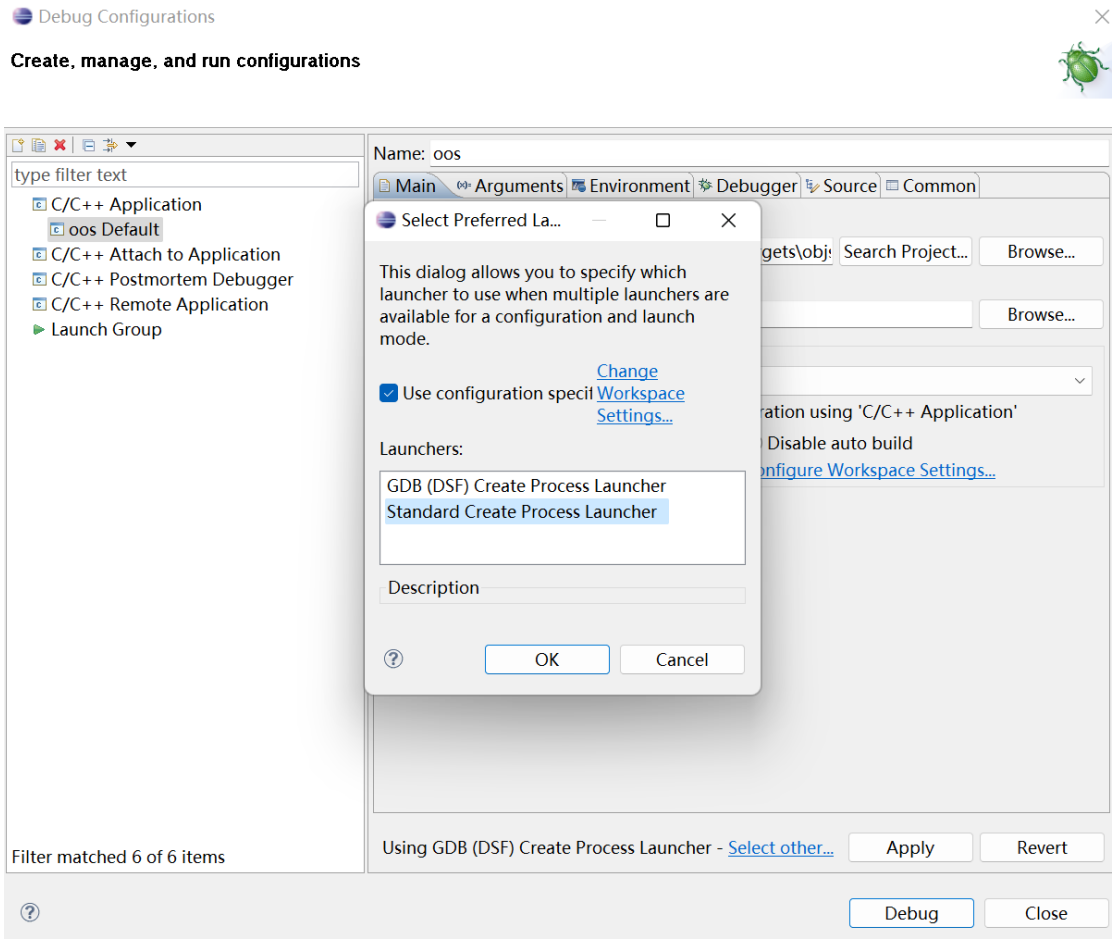
c. 导入项目

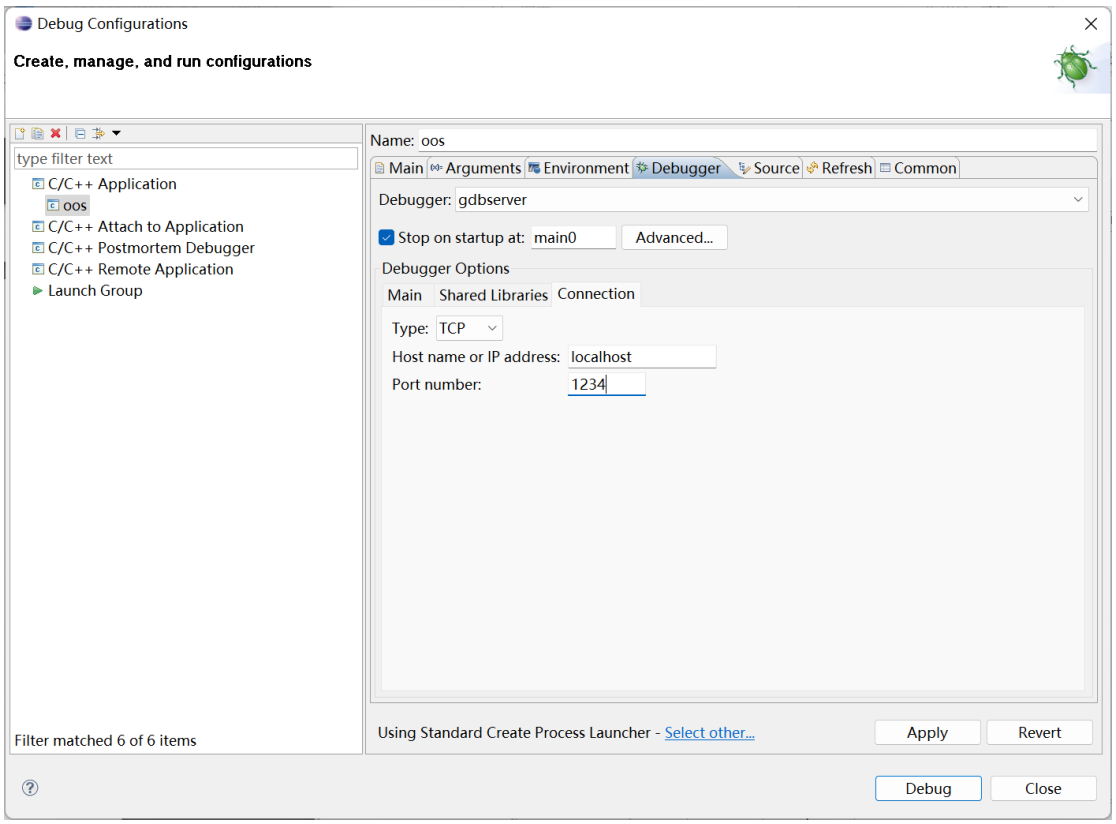


d. 设置工程属性



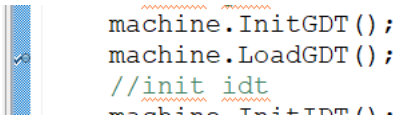
e. 配置远程调试


Debug Configurations
Create, manage, and run configurations
type filter text
C/C++ Application
oos Default
C/C++ Attach to Application
C/C++ Postmortem Debugger
C/C++ Remote Application
Launch Group
Filter matched 6 of 6 items
Name: oos
Main
Arguments
Environment
Debugger
Source
Common
Search Project...
Browse...
Browse...
ration using 'C/C++ Application'
Disable auto build
onfigure Workspace Settings...
Select Preferred La...
This dialog allows you to specify which launcher to use when multiple launchers are available for a configuration and launch mode.
Use configuration specif
Change Workspace Settings...
Launchers:
GDB (DSF) Create Process Launcher
Standard Create Process Launcher
Description
OK
Cancel
Using GDB (DSF) Create Process Launcher - Select other...
Apply
Revert
Debug
Close

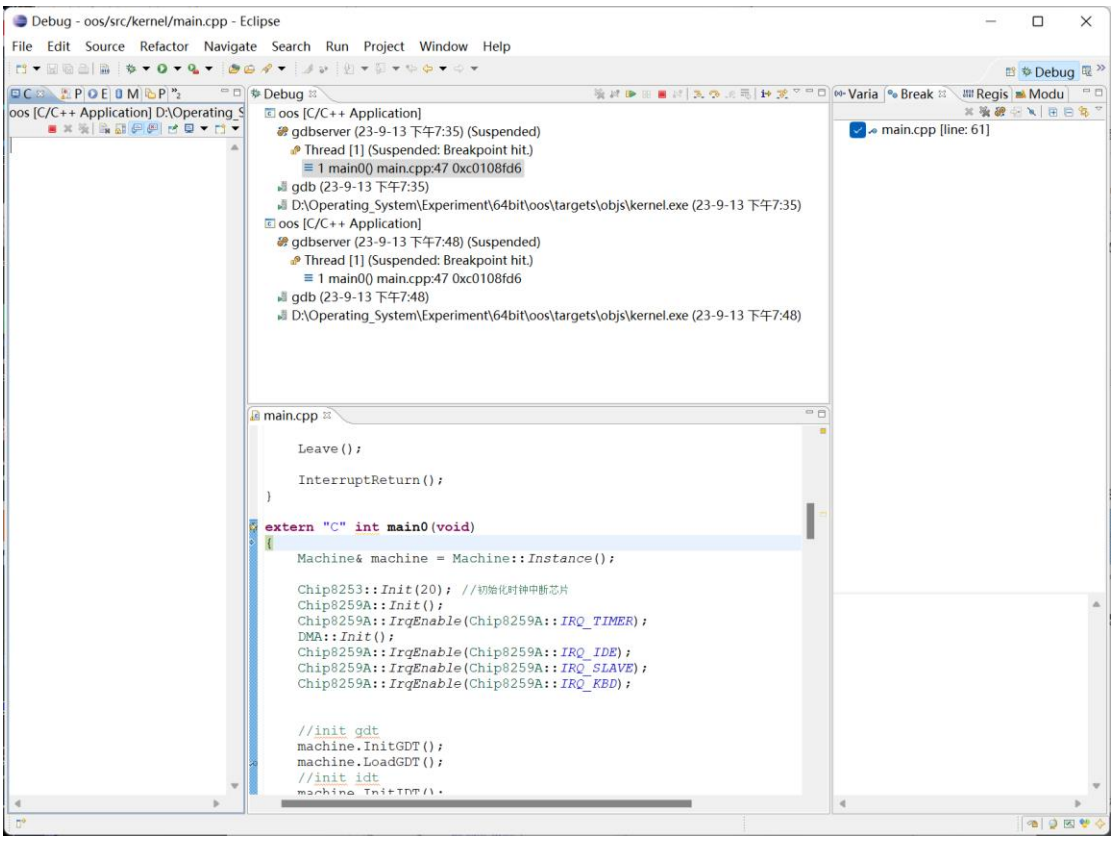

Debug Configurations
Create, manage, and run configurations
type filter text
C/C++ Application
oos
C/C++ Attach to Application
C/C++ Postmortem Debugger
C/C++ Remote Application
Launch Group
Filter matched 6 of 6 items
Name: oos
Main
Arguments
Environment
Debugger
Source
Refresh
Common
Debugger: gdbserver
Stop on startup at: main0
Advanced...
Debugger Options
Main
Shared Libraries
Connection
Type: TCP
Host name or IP address: localhost
Port number: 1234
Using Standard Create Process Launcher - Select other...
Apply
Revert
Debug
Close

三. UNIX V6++调试运行的观察

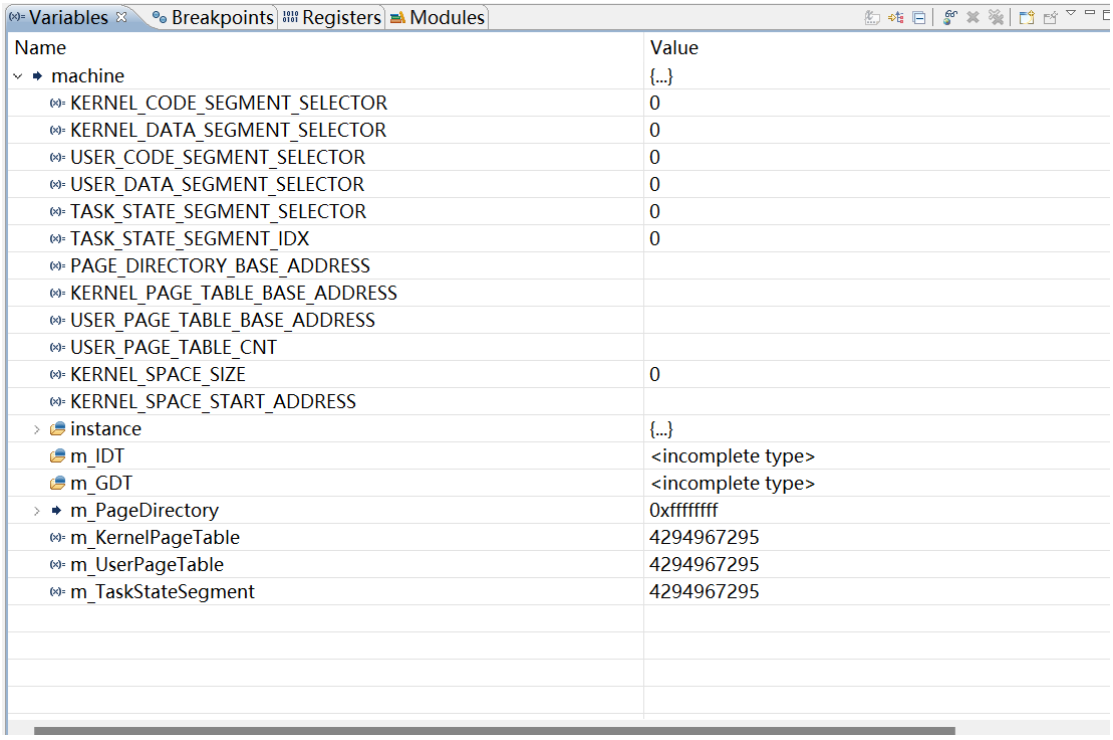
1. 设置断点

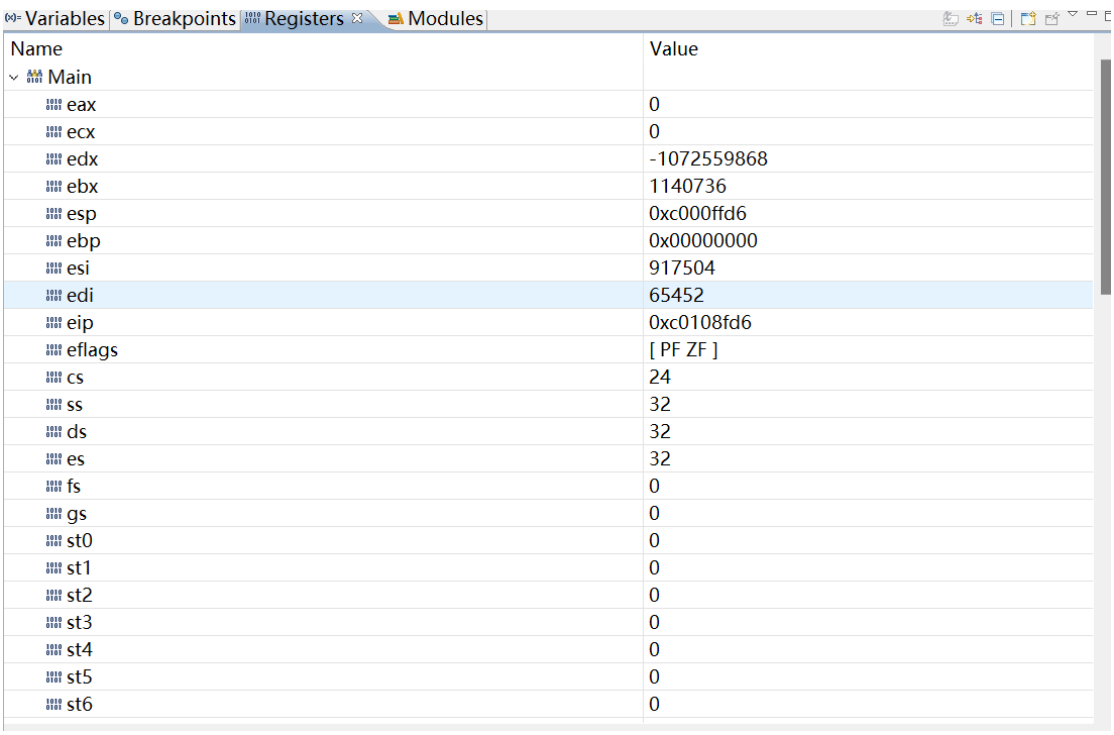


2. 调试



3. 观察变量和寄存器





四. 对子目录中所包含文件的用途的理解

1. **boot:**
   执行装入操作系统操作的汇编代码
2. **dev:**
   用于驱动和管理硬盘、内存等硬件设备的代码
3. **file:**
   用于对文件进行打开、管理等操作的代码
4. **include:**

包含源程序所需的头文件

5. **interrupt:**
   处理中断相关操作的代码
6. **kernel:**
   操作系统的内核，负责管理系统的进程，内存，设备驱动程序等
7. **lib:**
   库文件源码
8. **machine:**
   初始化芯片，设置内存分段，获取系统时间等直接指导硬件的代码
9. **mm:**
   管理和分配内存的相关代码
10. **pe:**
    可执行文件的解析器
11. **proc:**
    进程管理和分配的相关代码
12. **program:**
    实现系统相关指令的代码
13. **shell:**
    提供输入指令和执行指令的窗口
14. **test:**
    用于测试上述代码的文件
15. **tty:**
    控制屏幕、键盘等外设的代码
16. **Link.ld:**
    连接程序
17. **Makefile:**
    创建文件