

## ONLINE MAJOR ASSIGNMENT-01

### UNIX Systems Programming (CSE 3041)

#### Designing of an utility in C to behave in the same way as the standard **env** utility in Unix

The **env** utility examines the environment and modifies it to execute another command. When called without arguments, the **env** command writes the current environment to standard output. Type **env** on the terminal to get the current environment list. The *environment list* consists of an array of pointers to strings of the form *name=value*. The *name* specifies an environment variable, and the *value* specifies a string value associated with the environment variable. The last entry of the array is NULL.

The optional *utility* argument specifies the command to be executed under the modified environment. On the terminal type **\$ env <commandname>** to get the output of the command. Read **man** page to have more ideas on the **env** utility.

#### SYNOPSIS:

```
env -i [name=value]... [utility [argument ...]]
```

Now, students are required to design a C program called **doenv** that will simulate the behaviour of the **env** utility in the following ways as per the synopsis;

```
doenv -i [name=value]... [utility [argument ...]]
```

(a) If **\$ doenv** is typed on the terminal (i.e. when called with no argument), then **doenv** utility outputs the current environment to the standard output.

(b) If we type

```
$ doenv -i or
```

```
$ doenv -i name=value or
```

```
$ doenv -i name=value name1=value1 or
```

```
$ doenv -i name=value name1=value1
```

then the current environment will be modified by adding the *name = value* pairs and display the modified environment. Use **putenv()** function to add *name = value* to the current environment.

#### SYNOPSIS

```
#include <stdlib.h>

int putenv(char *string);
/* The putenv() function returns zero on success, or nonzero
   if an error occurs */
```

(c) If the **utility** argument is given, use **system()** to execute **utility** after the environment has been appropriately changed. Otherwise, print the changed environment to standard output, one entry per line. For example if you type **\$ doenv pwd**, then the command **pwd** will be executed.

**NOTE::** Your code must be able to report error messages, if any abnormal cases occur.

# Program:

```
#include <ctype.h>
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <string.h>
int main(int argc, char *argv[])
{
    int opt;
    char *pathvar, *token;
    if(!strcmp(argv[0], "doenv") && (argv[1]==NULL))
        system("env");
    else if(!strcmp(argv[0], "doenv") && (argv[1]!=NULL) && (argv[2]==NULL))
    {
        if(system(argv[1])!=0)
            printf("command not found\n");
    }
    else if(!strcmp(argv[0], "doenv") && (argv[1]!=NULL) && (argv[2]!=NULL))
    {
        while((opt = getopt(argc, argv, ":if:lr:")) != -1)
        {
            switch(opt)
            {
                case 'i':
                case 'l':
                case 'r': break;
                case 'f': break;
                case ':': break;
                case '?': break;
            }
        }
        for(; optind<argc; optind++)
        {
            printf("%s\n", argv[optind]); int
            retv=putenv(argv[optind]);
            if(retv!=0)
                printf("putenv error !!!");
            token = strtok(argv[optind], "=");
            pathvar = getenv(token);
        }
    }
    else
        printf("Command not found.");
    return 0;
}
```

# Output:

```
$ doenv
LESSOPEN=| /usr/bin/lesspipe %s USER=student TEXTDOMAIN=im-config
XDG_SEAT=seat0 SSH_AGENT_PID=3781 XDG_SESSION_TYPE=x11
LD_LIBRARY_PATH=/u01/app/oracle/product/11.2.0/xe/lib:
SHLVL=1 QT4_IM_MODULE=xim
HOME=/home/student DESKTOP_SESSION=ubuntu
GNOME_SHELL_SESSION_MODE=ubuntu
GTK_MODULES=gail:atk-bridge MANAGERPID=3609 DBUS_STARTER_BUS_TYPE=session
DBUS_SESSION_BUS_ADDRESS=unix:path=/run/user/1000/bus,guid=443b5ffbba6da
429ca8f5d2e5ca 219ff
COLORTERM=truecolor ORACLE_BASE=/u01/app/oracle
MANDATORY_PATH=/usr/share/gconf/ubuntu.mandatory.path
IM_CONFIG_PHASE=2
LOGNAME=student GTK_IM_MODULE=ibus JOURNAL_STREAM=9:34227
_=/bin/doenv DEFAULTS_PATH=/usr/share/gconf/ubuntu.default.path
USERNAME=student
XDG_SESSION_ID=3
TERM=xterm-256color GNOME_DESKTOP_SESSION_ID=this-is-deprecated
WINDOWPATH=2
PATH=/u01/app/oracle/product/11.2.0/xe/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin
:/bin:/usr/games:/usr/local/games:/snap/bin:./bin
INVOCATION_ID=4314ced169fa4437bd2b33d5eb1e2cac
SESSION_MANAGER=local/SKS329:@/tmp/.ICE-unix/3685,unix/SKS329:/tmp/.ICE-unix/3685
XDG_MENU_PREFIX=gnome-
GNOME_TERMINAL_SCREEN=/org/gnome/Terminal/screen/c3e2f2f4_e5e7_4fbe_8ccb
_7c557b614b ec
XDG_RUNTIME_DIR=/run/user/1000

DISPLAY=:0
ZEITGEIST_DATA_PATH=/home/student/.local/share/zeitgeist LANG=en_IN
XDG_CURRENT_DESKTOP=ubuntu:GNOME
LS_COLORS=rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:c
d=40;33;01:o
r=40;31;01:mi=00:su=37;41:sg=30;43:ca=30;41:tw=30;42:ow=34;42:st=37;44:ex=01;32:*.
tar=01;31:*
```

```
.tgz=01;31:*.arc=01;31:*.arj=01;31:*.taz=01;31:*.lha=01;31:*.lz4=01;31:*.lzh=01;31:*.lz  
ma=01;31:*.  
tlz=01;31:*.txz=01;31:*.tzo=01;31:*.t7z=01;31:*.zip=01;31:*.z=01;31:*.Z=01;31:*.dz=01;3  
1:*.gz=01;  
31:*.lrz=01;31:*.lz=01;31:*.lzo=01;31:*.xz=01;31:*.zst=01;31:*.tzst=01;31:*.bz2=01;31:*.  
bz=01;31:*.  
tbz=01;31:*.tbz2=01;31:*.tz=01;31:*.deb=01;31:*.rpm=01;31:*.jar=01;31:*.war=01;31:*.e  
ar=01;31:*.  
*.sar=01;31:*.rar=01;31:*.alz=01;31:*.ace=01;31:*.zoo=01;31:*.cpio=01;31:*.7z=01;31:*.r  
z=01;31:*.  
cab=01;31:*.wim=01;31:*.swm=01;31:*.dwm=01;31:*.esd=01;31:*.jpg=01;35:*.jpeg=01;3  
5:*.mjpg=  
01;35:*.mjpeg=01;35:*.gif=01;35:*.bmp=01;35:*.pbm=01;35:*.pgm=01;35:*.ppm=01;35:*.  
tga=01;3  
5:*.xbm=01;35:*.xpm=01;35:*.tif=01;35:*.tiff=01;35:*.png=01;35:*.svg=01;35:*.svgz=01;  
35:*.mng=  
01;35:*.pcx=01;35:*.mov=01;35:*.mpg=01;35:*.mpeg=01;35:*.m2v=01;35:*.mkv=01;35:*.  
webm=01  
;35:*.ogm=01;35:*.mp4=01;35:*.m4v=01;35:*.mp4v=01;35:*.vob=01;35:*.qt=01;35:*.nuv  
=01;35:*.  
wmv=01;35:*.asf=01;35:*.rm=01;35:*.rmvb=01;35:*.flc=01;35:*.avi=01;35:*.fli=01;35:*.fl  
v=01;35:*.  
gl=01;35:*.dl=01;35:*.xcf=01;35:*.xwd=01;35:*.yuv=01;35:*.cgm=01;35:*.emf=01;35:*.og  
v=01;35:*.  
ogx=01;35:*.aac=00;36:*.au=00;36:*.flac=00;36:*.m4a=00;36:*.mid=00;36:*.midi=00;36:  
*.mka=00;  
36:*.mp3=00;36:*.mpc=00;36:*.ogg=00;36:*.ra=00;36:*.wav=00;36:*.oga=00;36:*.opus=0  
0;36:*.spx  
=00;36:*.xspf=00;36:  
XDG_SESSION_DESKTOP=ubuntu XMODIFIERS=@im=ibus  
GNOME_TERMINAL_SERVICE=:1.173  
XAUTHORITY=/run/user/1000/gdm/Xauthority SSH_AUTH_SOCK=/tmp/ssh-  
kMondTwD9Qxo/agent.3685 ORACLE_HOME=/u01/app/oracle/product/11.2.0/x  
SHELL=/bin/bash  
QT_ACCESSIBILITY=1  
GDMSESSION=ubuntu LESSCLOSE=/usr/bin/lesspipe %s %s  
TEXTDOMAINDIR=/usr/share/locale/  
GPG_AGENT_INFO=/run/user/1000/gnupg/S.gpg-agent:0:1 ORACLE_SID=XE  
XDG_VTNR=2  
QT_IM_MODULE=ibus  
PWD=/home/student/6th Semester/USP/Major Assignment-2  
CLUTTER_IM_MODULE=xim
```

```
XDG_DATA_DIRS=/usr/share/ubuntu:/usr/local/share:/usr/share:/var/lib/snapd/desktop
DBUS_STARTER_ADDRESS=unix:path=/run/user/1000/bus,guid=443b5ffbba6da429ca
8f5d2e5ca219f f
XDG_CONFIG_DIRS=/etc/xdg/xdg-ubuntu:/etc/xdg
NLS_LANG=ENGLISH_INDIA.AL32UTF8 VTE_VERSION=5202
$ doenv -i name=value name=value
$ doenv -i name1=value1 name2=value2 name3=value3 name1=value1
name2=value2 name3=value3
```