Systems Commands
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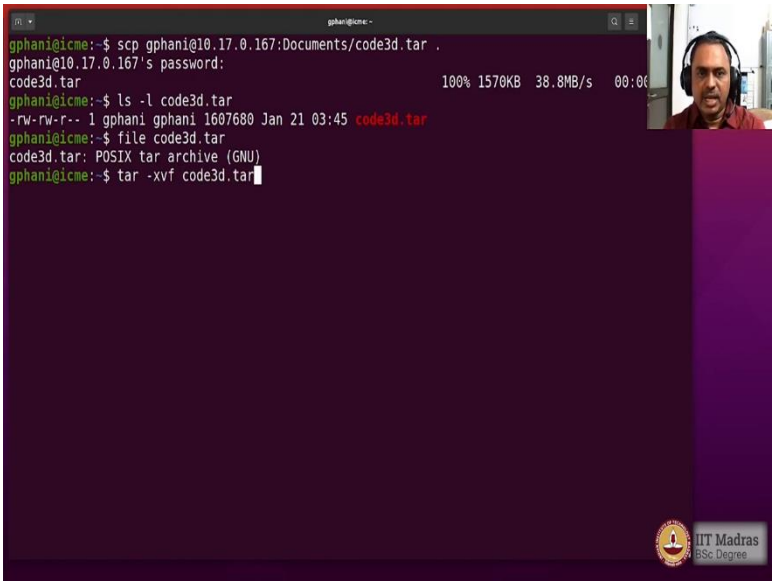
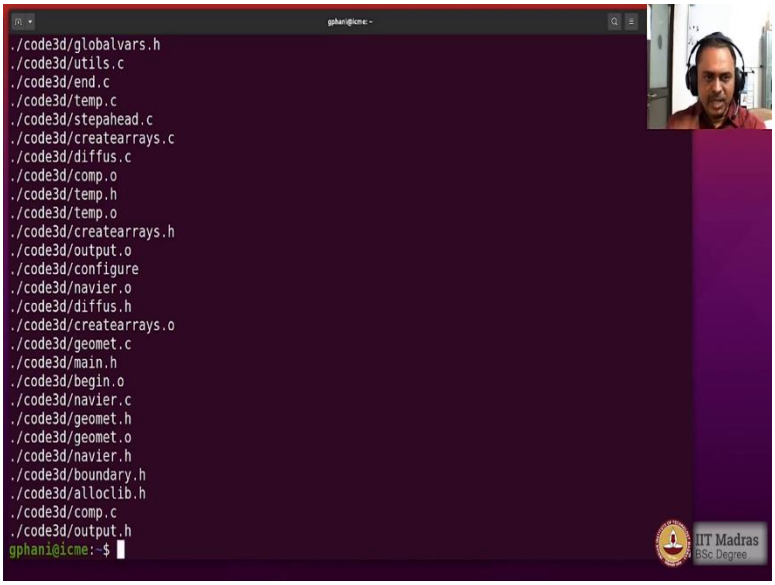
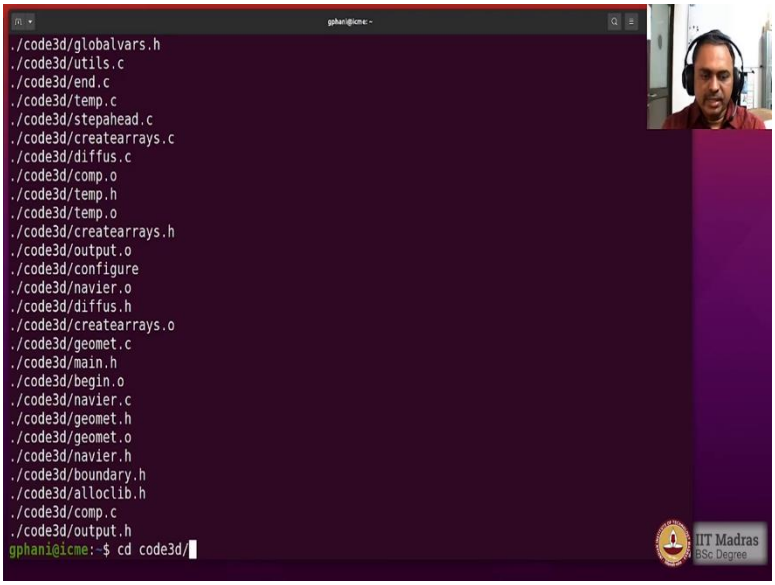
BSc Degree
Command line editors – Part 03

(Refer Slide Time: 00:14)






gphani@icme: ~
./code3d/globalvars.h
./code3d/utils.c
./code3d/end.c
./code3d/temp.c
./code3d/stepahead.c
./code3d/createarrays.c
./code3d/diffus.c
./code3d/comp.o
./code3d/temp.h
./code3d/temp.o
./code3d/createarrays.h
./code3d/output.o
./code3d/configure
./code3d/navier.o
./code3d/diffus.h
./code3d/createarrays.o
./code3d/geomet.c
./code3d/main.h
./code3d/begin.o
./code3d/navier.c
./code3d/geomet.h
./code3d/geomet.o
./code3d/navier.h
./code3d/boundary.h
./code3d/alloclib.h
./code3d/comp.c
./code3d/output.h
gphani@icme:~$ cd code3d/
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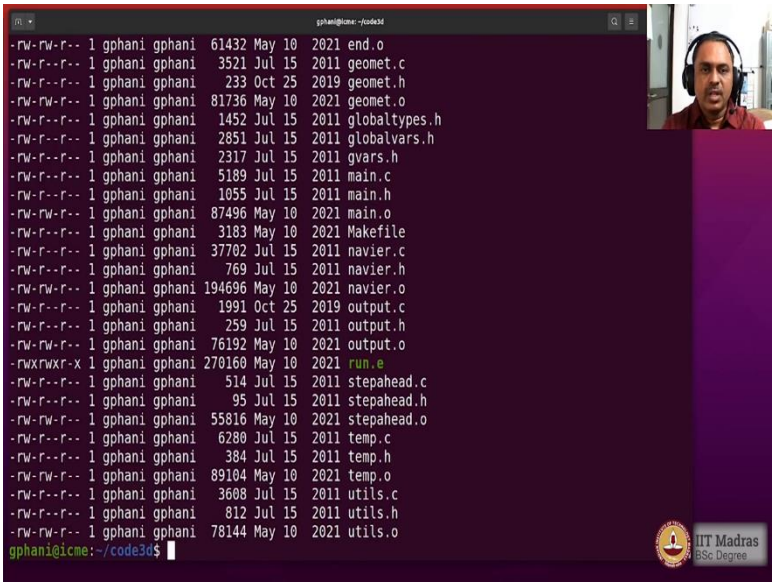
gphani@icme: ~/code3d
-rw-rw-r-- 1 gphani gphani 61432 May 10 2021 end.o
-rw-r--r-- 1 gphani gphani 3521 Jul 15 2011 geomet.c
-rw-r--r-- 1 gphani gphani 233 Oct 25 2019 geomet.h
-rw-rw-r-- 1 gphani gphani 81736 May 10 2021 geomet.o
-rw-r--r-- 1 gphani gphani 1452 Jul 15 2011 globaltypes.h
-rw-r--r-- 1 gphani gphani 2851 Jul 15 2011 globalvars.h
-rw-r--r-- 1 gphani gphani 2317 Jul 15 2011 gvars.h
-rw-r--r-- 1 gphani gphani 5189 Jul 15 2011 main.c
-rw-r--r-- 1 gphani gphani 1055 Jul 15 2011 main.h
-rw-rw-r-- 1 gphani gphani 87496 May 10 2021 main.o
-rw-r--r-- 1 gphani gphani 3183 May 10 2021 Makefile
-rw-r--r-- 1 gphani gphani 37702 Jul 15 2011 navier.c
-rw-r--r-- 1 gphani gphani 769 Jul 15 2011 navier.h
-rw-rw-r-- 1 gphani gphani 194696 May 10 2021 navier.o
-rw-r--r-- 1 gphani gphani 1991 Oct 25 2019 output.c
-rw-r--r-- 1 gphani gphani 259 Jul 15 2011 output.h
-rw-rw-r-- 1 gphani gphani 76192 May 10 2021 output.o
-rwxrwxr-x 1 gphani gphani 270160 May 10 2021 run.e
-rw-r--r-- 1 gphani gphani 514 Jul 15 2011 stepahead.c
-rw-r--r-- 1 gphani gphani 95 Jul 15 2011 stepahead.h
-rw-rw-r-- 1 gphani gphani 55816 May 10 2021 stepahead.o
-rw-r--r-- 1 gphani gphani 6280 Jul 15 2011 temp.c
-rw-r--r-- 1 gphani gphani 384 Jul 15 2011 temp.h
-rw-rw-r-- 1 gphani gphani 89104 May 10 2021 temp.o
-rw-r--r-- 1 gphani gphani 3608 Jul 15 2011 utils.c
-rw-r--r-- 1 gphani gphani 812 Jul 15 2011 utils.h
-rw-rw-r-- 1 gphani gphani 78144 May 10 2021 utils.o
gphani@icme:~/code3d$
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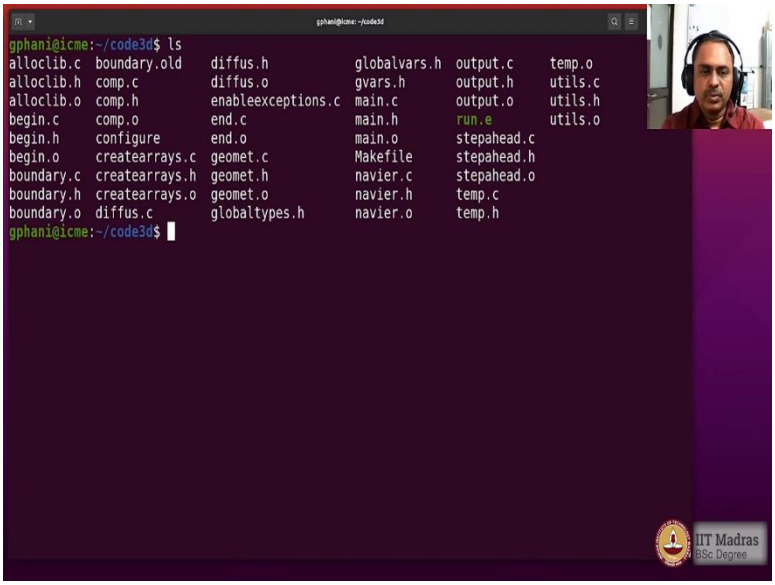
gphani@icme: ~/code3d
gphani@icme:~/code3d$ ls
alloclib.c boundary.old diffus.h globalvars.h output.c temp.o
alloclib.h comp.c diffus.o gvars.h output.h utils.c
alloclib.o comp.h enableexceptions.c main.c output.o utils.h
begin.c comp.o end.c main.h run.e utils.o
begin.h configure end.o main.o stepahead.c
begin.o createarrays.c geomet.c Makefile stepahead.h
boundary.c createarrays.h geomet.h navier.c stepahead.o
boundary.h createarrays.o geomet.o navier.h temp.c
boundary.o diffus.c globaltypes.h navier.o temp.h
gphani@icme:~/code3d$
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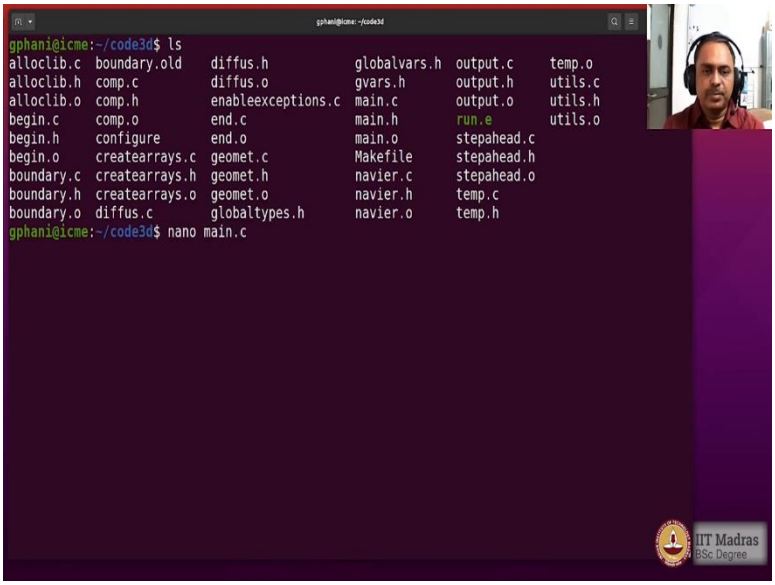
gphani@icme: ~/code3d
gphani@icme:~/code3d$ ls
alloclib.c boundary.old diffus.h globalvars.h output.c temp.o
alloclib.h comp.c diffus.o gvars.h output.h utils.c
alloclib.o comp.h enableexceptions.c main.c output.o utils.h
begin.c comp.o end.c main.h run.e utils.o
begin.h configure end.o main.o stepahead.c
begin.o createarrays.c geomet.c Makefile stepahead.h
boundary.c createarrays.h geomet.h navier.c stepahead.o
boundary.h createarrays.o geomet.o navier.h temp.c
boundary.o diffus.c globaltypes.h navier.o temp.h
gphani@icme:~/code3d$ nano main.c
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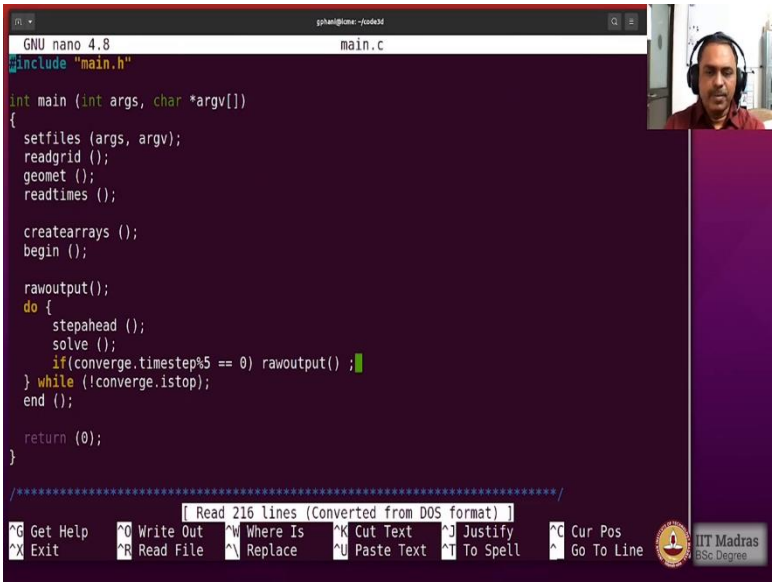
gphani@icme: ~/code3d
GNU nano 4.8 main.c
#include "main.h"
int main (int args, char *argv[])
{
setfiles (args, argv);
readgrid ();
geomet ();
readtimes ();
createarrays ();
begin ();
rawoutput();
do {
stepahead ();
solve ();
if(converge.timestep%5 == 0) rawoutput() ;
} while (!converge.istop);
end ();
return (0);
}
/***/
[Read 216 lines (Converted from DOS format)]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Paste Text ^T To Spell ^_ Go To Line
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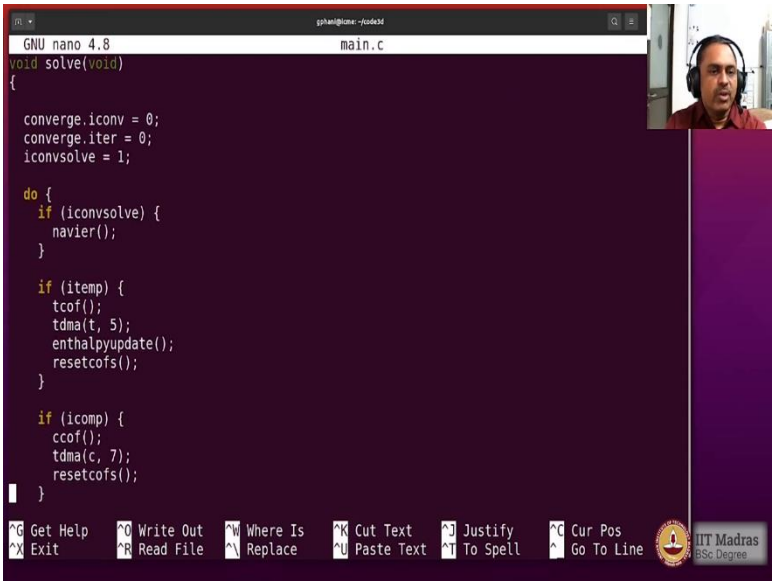
gphani@icme: ~/code3d
GNU nano 4.8 main.c
void solve(void)
{
converge.iconv = 0;
converge.iter = 0;
iconvsolve = 1;
do {
if (iconvsolve) {
navier();
}
if (itemp) {
tcof();
tdma(t, 5);
enthalpyupdate();
resetcofs();
}
if (icomp) {
ccof();
tdma(c, 7);
resetcofs();
}
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Paste Text ^T To Spell ^_ Go To Line
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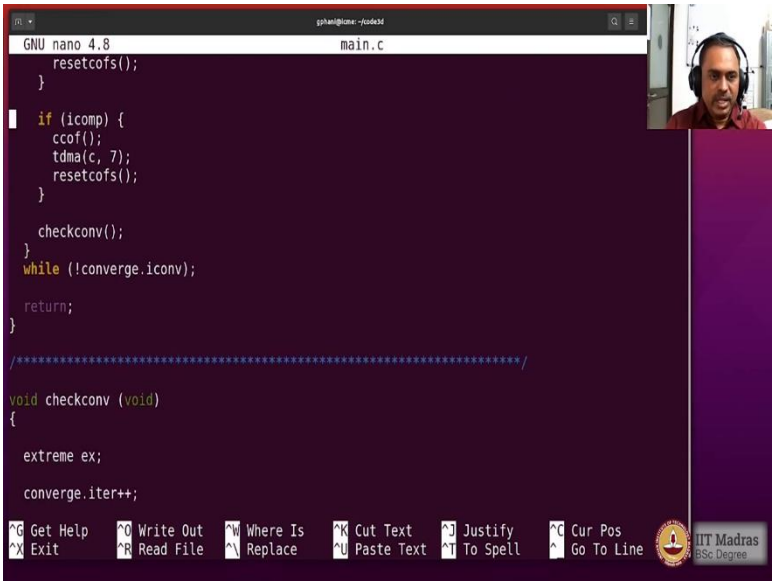
GNU nano 4.8 main.c
resetcofs();
}
if (icomp) {
ccof();
tdma(c, 7);
resetcofs();
}
checkconv();
}
while (!converge.iconv);
return;
}
/***/
void checkconv (void)
{
extreme ex;
converge.iter++;
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Paste Text ^T To Spell ^_ Go To Line
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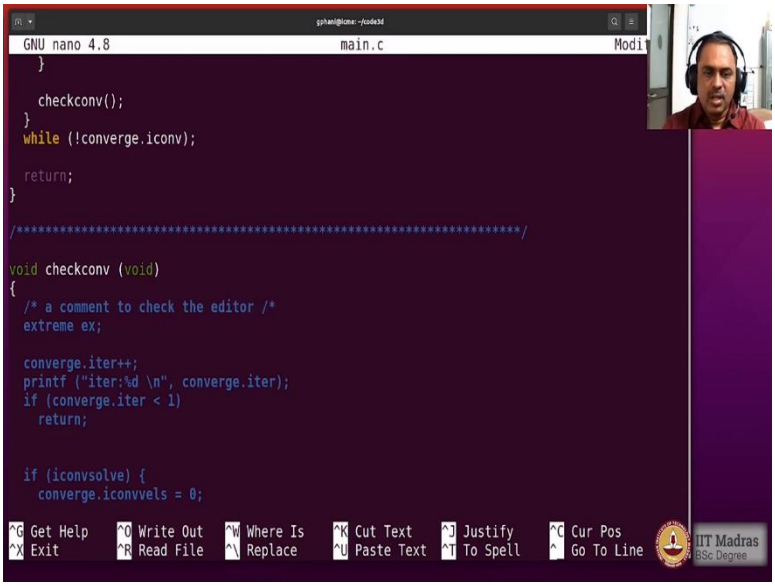
GNU nano 4.8 main.c
}
checkconv();
}
while (!converge.iconv);
return;
}
/***/
void checkconv (void)
{
/* a comment to check the editor /*
extreme ex;
converge.iter++;
printf ("iter:%d \n", converge.iter);
if (converge.iter < 1)
return;
if (iconvsolve) {
converge.iconvvels = 0;
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Paste Text ^T To Spell ^_ Go To Line
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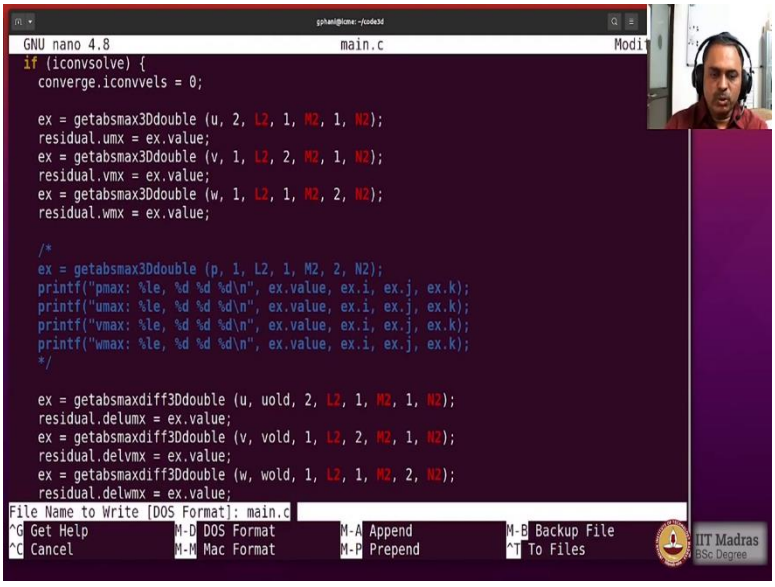
GNU nano 4.8 main.c
if (iconvsolve) {
converge.iconvvels = 0;
ex = getabsmax3Ddouble (u, 2, L2, 1, M2, 1, N2);
residual.umx = ex.value;
ex = getabsmax3Ddouble (v, 1, L2, 2, M2, 1, N2);
residual.vmx = ex.value;
ex = getabsmax3Ddouble (w, 1, L2, 1, M2, 2, N2);
residual.wmx = ex.value;
/*
ex = getabsmax3Ddouble (p, 1, L2, 1, M2, 2, N2);
printf("pmax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
printf("umax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
printf("vmax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
printf("wmax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
*/
ex = getabsmaxdiff3Ddouble (u, uold, 2, L2, 1, M2, 1, N2);
residual.delumx = ex.value;
ex = getabsmaxdiff3Ddouble (v, vold, 1, L2, 2, M2, 1, N2);
residual.delvmx = ex.value;
ex = getabsmaxdiff3Ddouble (w, wold, 1, L2, 1, M2, 2, N2);
residual.delwmx = ex.value;
File Name to Write [DOS Format]: main.c
^G Get Help M-D DOS Format M-A Append M-B Backup File
^C Cancel M-M Mac Format M-P Prepend ^T To Files
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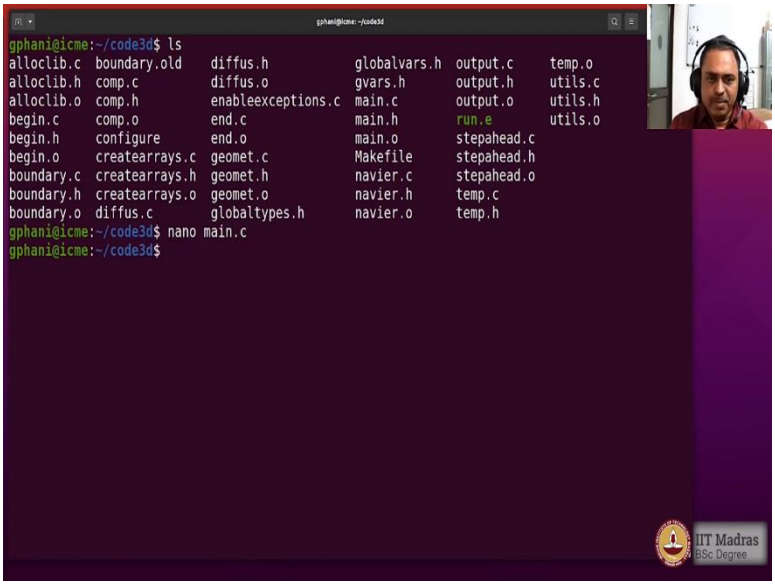


Now, to illustrate the usefulness of Vi editor in editing some source codes in languages such as C, I will fetch one of my old program codes from another machine, and then I will show them to you how the syntax highlighting etc. would work. So, the file is actually in my other machine, so I would bring that up using the secure copy.

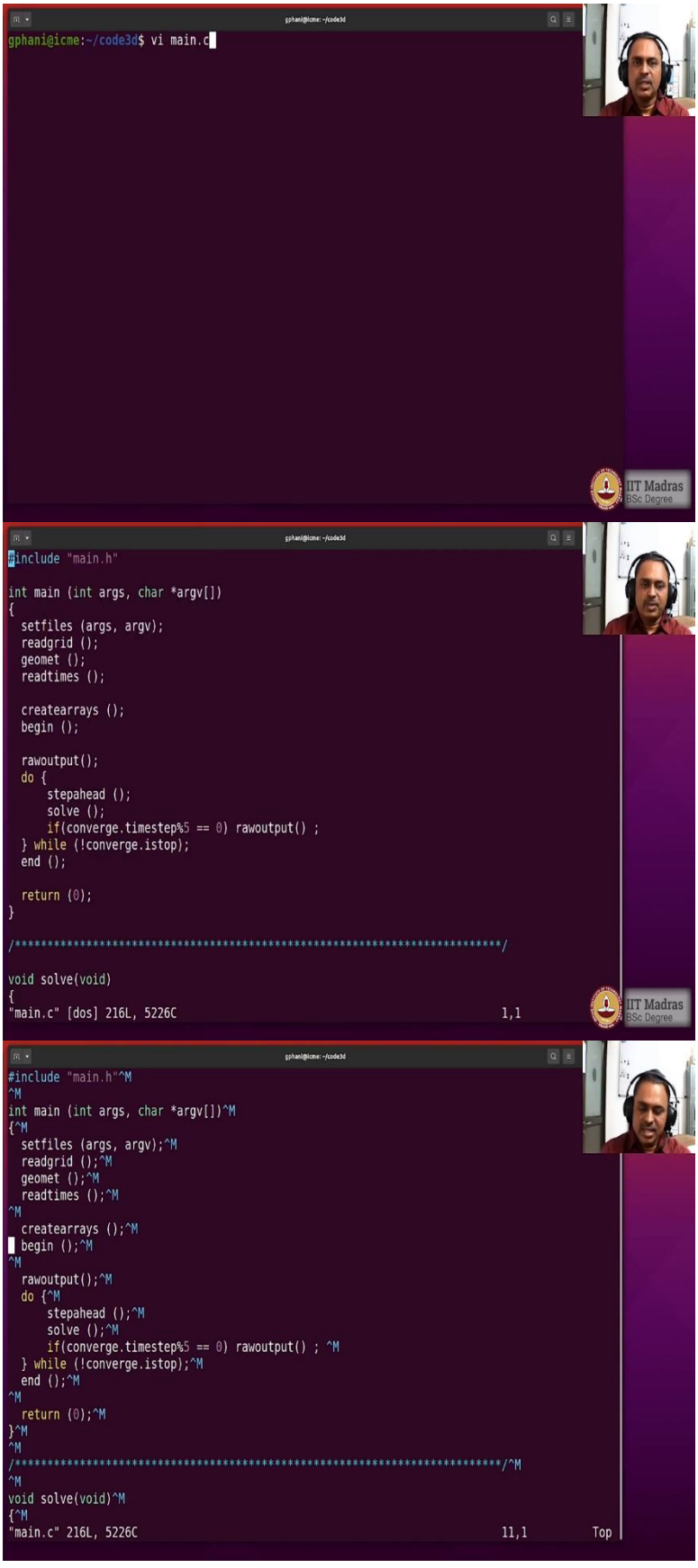
So, you can see that I am moving the files using the command line environment. So, secure copy from the IP address, which is next to me from the folder called documents I am getting code 3d dot tar. And that file, I want to bring it at the current that is current directory. And it asked me for my password of the particular machine I have done it.

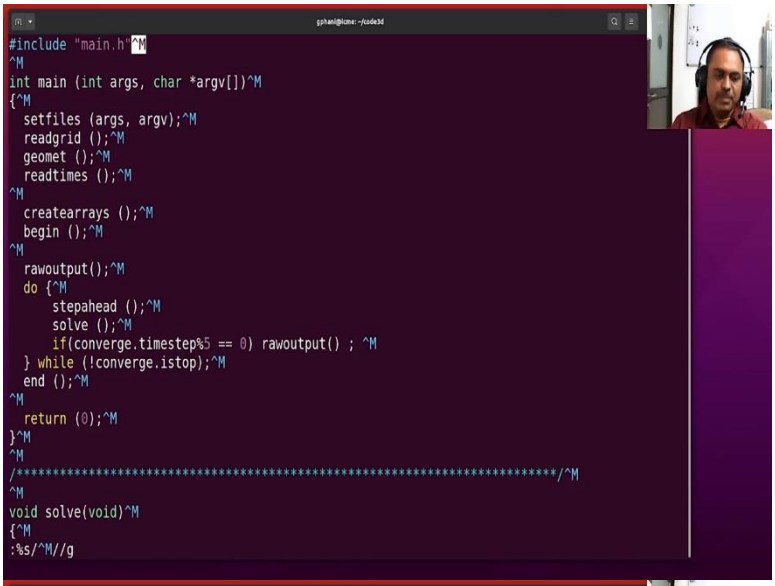
So, you can see that I have now downloaded a tar file called code 3d dot tar. So, what is this file type? So, it is an archive file. And I can untar it so I can open up all the files, so tar minus xvf code 3d dot tar, and it has created a directory in which there are a number of files. So, I go to the directory, and I want to now view some of these text files using editors.

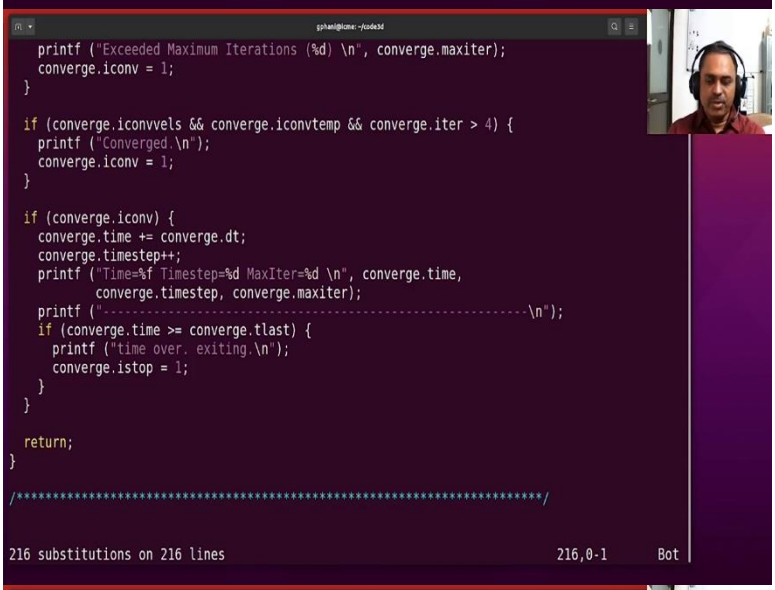
So, first I will show you with the pico editor, which we have seen the main dot c, I want to open. So nano main dot c. And you can see that the file is visible the different colors for different keywords of the C language, and you are able to move around within the file using the arrow keys itself. And you could also make some changes, so I can just try to make a change here, which is like a comment.

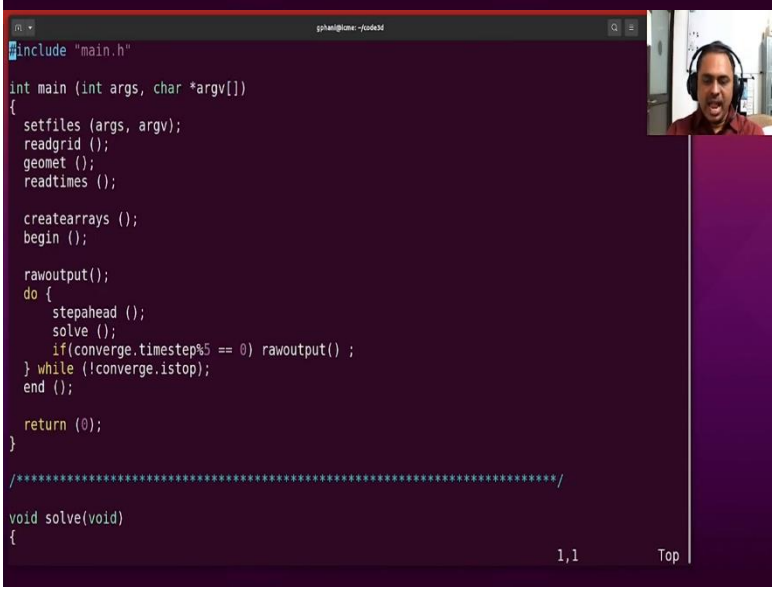
So, I have just made a comment. And already it is getting in a different color to indicate the syntax. And I can now save and come out so Ctrl O to save the file and Ctrl X to come out. So, you can use nano editor to edit your source codes, quite convenient and within the terminal environment itself. Now I want to show the same thing in a Vi editor.

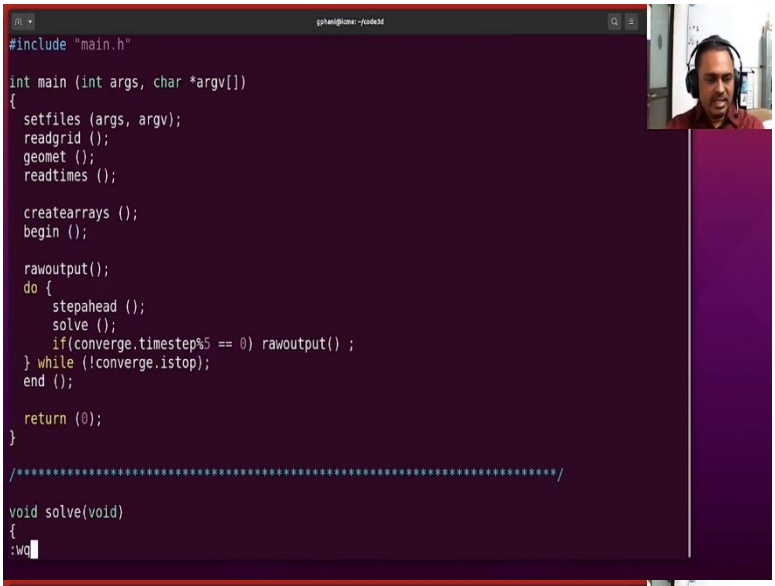
(Refer Slide Time: 02:44)



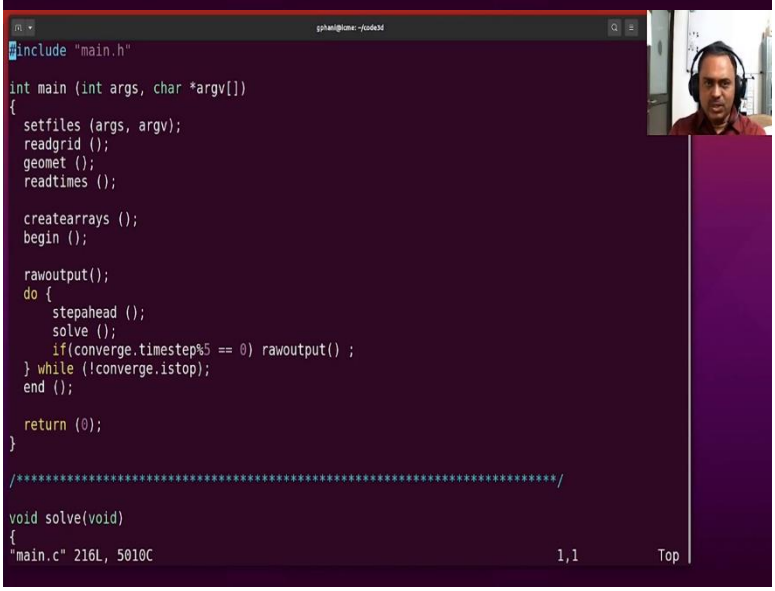

gphani@icme: ~/code3d
#include "main.h"^M
^M
int main (int args, char *argv[])^M
{^M
setfiles (args, argv);^M
readgrid ();^M
geomet ();^M
readtimes ();^M
^M
createarrays ();^M
begin ();^M
^M
rawoutput();^M
do {^M
stepahead ();^M
solve ();^M
if(converge.timestep%5 == 0) rawoutput() ; ^M
} while (!converge.istop);^M
end ();^M
^M
return (0);^M
}^M
^M
/***/^M
^M
void solve(void)^M
{^M
:%s/^M//g

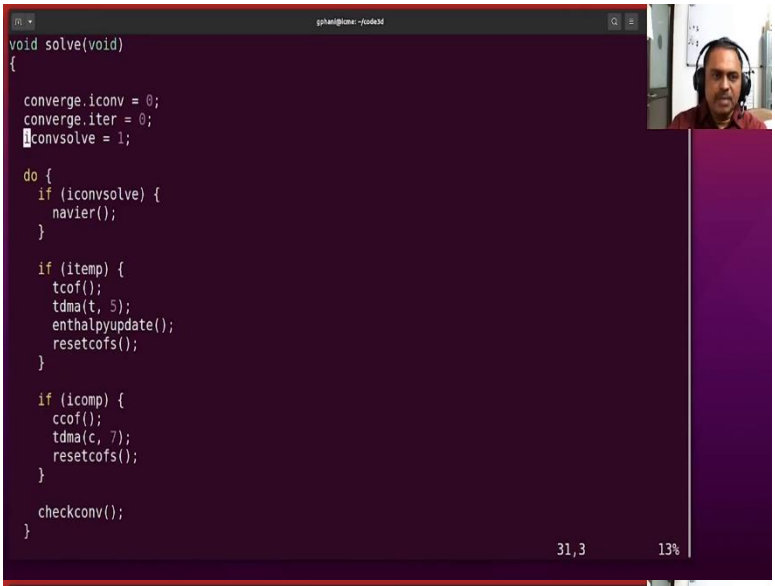

gphani@icme: ~/code3d
printf ("Exceeded Maximum Iterations (%d) \n", converge.maxiter);
converge.iconv = 1;
}
if (converge.iconvvels && converge.iconvtemp && converge.iter > 4) {
printf ("Converged.\n");
converge.iconv = 1;
}
if (converge.iconv) {
converge.time += converge.dt;
converge.timestep++;
printf ("Time=%f Timestep=%d MaxIter=%d \n", converge.time,
converge.timestep, converge.maxiter);
printf ("---\n");
if (converge.time >= converge.tlast) {
printf ("time over. exiting.\n");
converge.istop = 1;
}
}
return;
}
/***/
216 substitutions on 216 lines
216,0-1
Bot

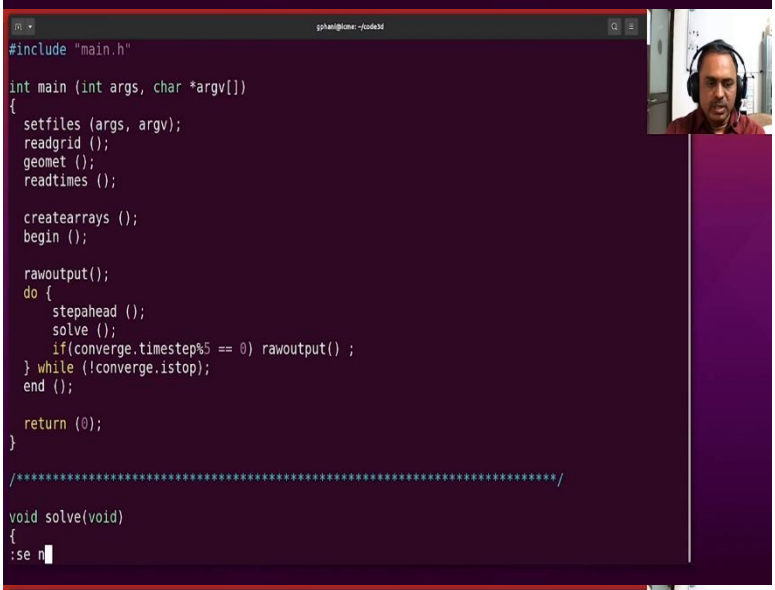

gphani@icme: ~/code3d
#include "main.h"
int main (int args, char *argv[])
{
setfiles (args, argv);
readgrid ();
geomet ();
readtimes ();
createarrays ();
begin ();
rawoutput();
do {
stepahead ();
solve ();
if(converge.timestep%5 == 0) rawoutput() ;
} while (!converge.istop);
end ();
return (0);
}
/***/
void solve(void)
{
1,1
Top

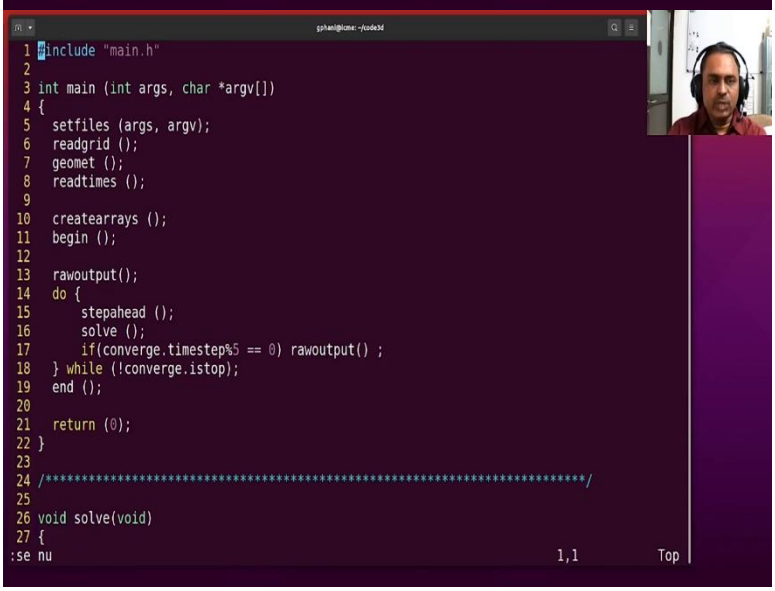

gphani@icme: ~/code3d
#include "main.h"
int main (int args, char *argv[])
{
setfiles (args, argv);
readgrid ();
geomet ();
readtimes ();
createarrays ();
begin ();
rawoutput();
do {
stepahead ();
solve ();
if(converge.timestep%5 == 0) rawoutput() ;
} while (!converge.istop);
end ();
return (0);
}
/*****/
void solve(void)
{
:wq

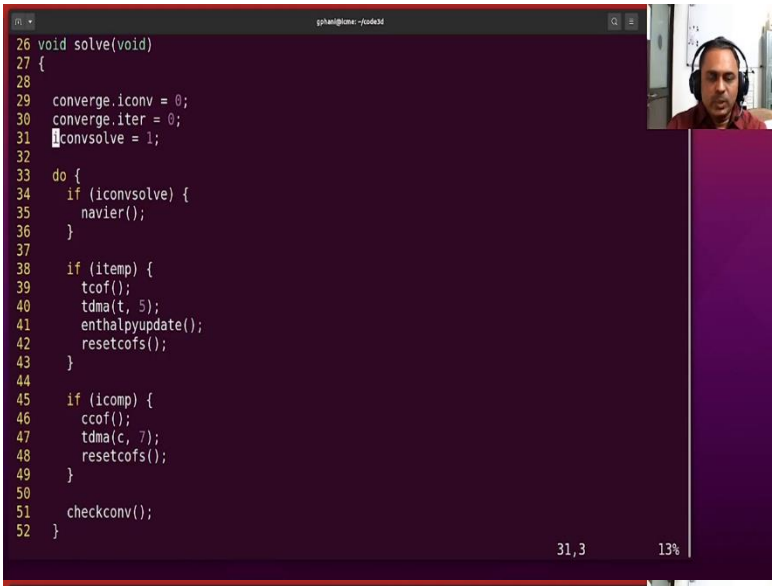

gphani@icme: ~/code3d
gphani@icme:~/code3d$ vi main.c
gphani@icme:~/code3d$ vi -b main.c
gphani@icme:~/code3d$

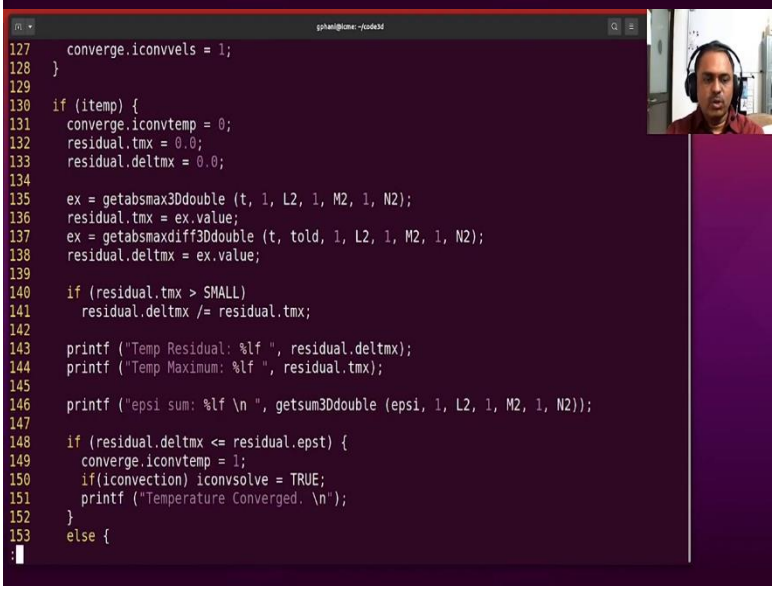

gphani@icme: ~/code3d
#include "main.h"
int main (int args, char *argv[])
{
setfiles (args, argv);
readgrid ();
geomet ();
readtimes ();
createarrays ();
begin ();
rawoutput();
do {
stepahead ();
solve ();
if(converge.timestep%5 == 0) rawoutput() ;
} while (!converge.istop);
end ();
return (0);
}
/*****/
void solve(void)
{
"main.c" 216L, 5010C 1,1 Top

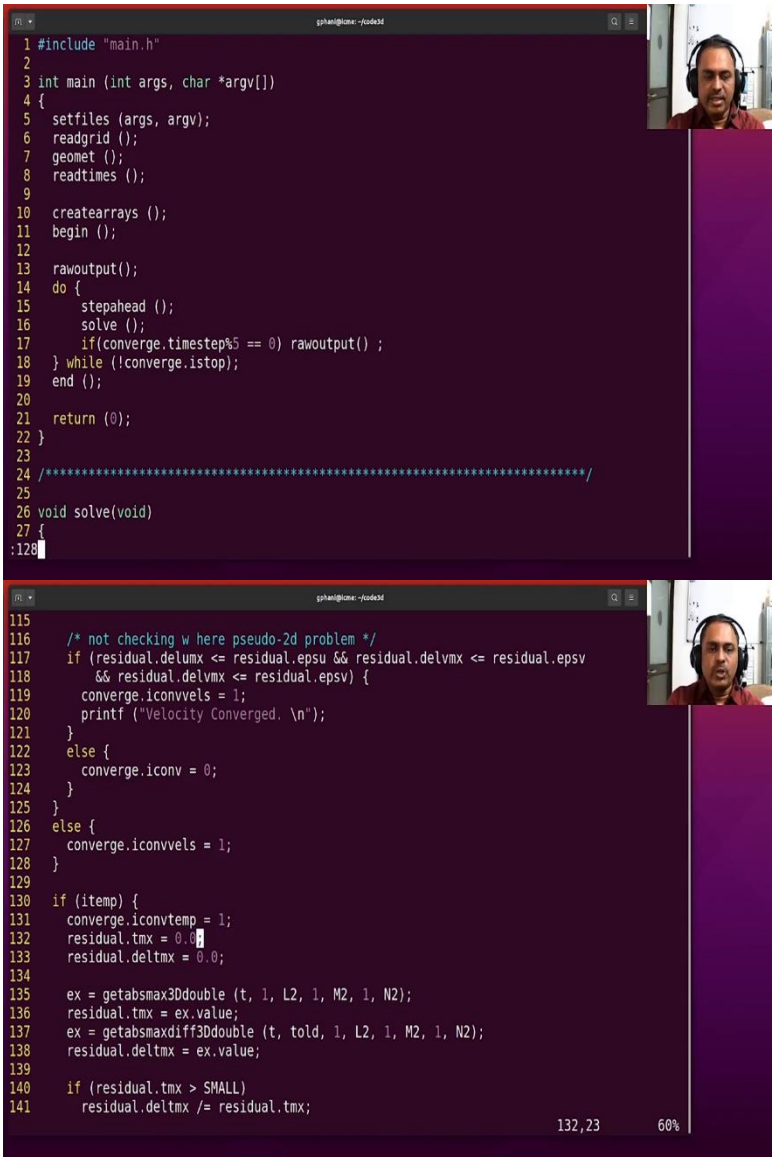

gphani@icme: ~/code3d
void solve(void)
{
converge.iconv = 0;
converge.iter = 0;
iconvsolve = 1;
do {
if (iconvsolve) {
navier();
}
if (itemp) {
tcof();
tdma(t, 5);
enthalpyupdate();
resetcofs();
}
if (icomp) {
ccof();
tdma(c, 7);
resetcofs();
}
checkconv();
}
31,3 13%


gphani@icme: ~/code3d
#include "main.h"
int main (int args, char *argv[])
{
setfiles (args, argv);
readgrid ();
geomet ();
readtimes ();
createarrays ();
begin ();
rawoutput();
do {
stepahead ();
solve ();
if(converge.timestep%5 == 0) rawoutput() ;
} while (!converge.istop);
end ();
return (0);
}
/***/
void solve(void)
{
:se n


gphani@icme: ~/code3d
1 #include "main.h"
2
3 int main (int args, char *argv[])
4 {
5 setfiles (args, argv);
6 readgrid ();
7 geomet ();
8 readtimes ();
9
10 createarrays ();
11 begin ();
12
13 rawoutput();
14 do {
15 stepahead ();
16 solve ();
17 if(converge.timestep%5 == 0) rawoutput() ;
18 } while (!converge.istop);
19 end ();
20
21 return (0);
22 }
23
24 /***/
25
26 void solve(void)
27 {
:se nu
1,1 Top


gphani@icme: ~/code3d
26 void solve(void)
27 {
28
29   converge.iconv = 0;
30   converge.iter = 0;
31   iconvsolve = 1;
32
33   do {
34   if (iconvsolve) {
35   navier();
36   }
37
38   if (itemp) {
39   tcof();
40   tdma(t, 5);
41   enthalpyupdate();
42   resetcofs();
43   }
44
45   if (icomp) {
46   ccof();
47   tdma(c, 7);
48   resetcofs();
49   }
50
51   checkconv();
52   }
31,3 13%


gphani@icme: ~/code3d
127   converge.iconvvels = 1;
128   }
129
130   if (itemp) {
131   converge.iconvtemp = 0;
132   residual.tmx = 0.0;
133   residual.deltmx = 0.0;
134
135   ex = getabsmax3Ddouble (t, 1, L2, 1, M2, 1, N2);
136   residual.tmx = ex.value;
137   ex = getabsmaxdiff3Ddouble (t, told, 1, L2, 1, M2, 1, N2);
138   residual.deltmx = ex.value;
139
140   if (residual.tmx > SMALL)
141   residual.deltmx /= residual.tmx;
142
143   printf ("Temp Residual: %lf ", residual.deltmx);
144   printf ("Temp Maximum: %lf ", residual.tmx);
145
146   printf ("epsi sum: %lf \n ", getsum3Ddouble (epsi, 1, L2, 1, M2, 1, N2));
147
148   if (residual.deltmx <= residual.epst) {
149   converge.iconvtemp = 1;
150   if(iconvection) iconvsolve = TRUE;
151   printf ("Temperature Converged. \n");
152   }
153   else {
:



So, when you open, you can see that there is no menu on the top, etc., it is a little bit more convenient. And it says that there is a, this file is actually DOS format. So here at the bottom, you will see that it says DOS format, which means that, the file was originally created in a Windows system, and therefore, at the end of every line there is a character, which is like carriage return, which is why it is called as a DOS file.

So, let us view that character. So, I can ask Vi editor in the binary mode, so I can now see what is the character it is complaining of. So, you can see that this is Ctrl M at the end of every line, which is actually what makes it a DOS file. So, I want to remove that additional character from the file, so I can do that by search and replace.

So, this is the power of Vi editor I am illustrating to you, so I press Escape to ensure that I am in the command mode, press colon, shift colon so that I am in the ex mode, the bottom you can see I am in the ex mode. And I want to remove it from every line, so percentage sign

means everywhere substitute and then what do I use to capture this command, so Ctrl V, and then Ctrl M would capture the special character so Ctrl V, Ctrl M, it has captured the special character. And I want to replace with a null so that there is a deletion of that character. And I want to do it everywhere, so I press a g.

Now, you see that when I press enter what happens. That character has been removed from the whole file and now I can save the file I will come out. And I open the file once more and it does not complain that it is a DOS file because there is no carriage return at the end of each line. So, you have removed one character from every of these lines in 216 lines in one go, so that is the power of a Vi editor.

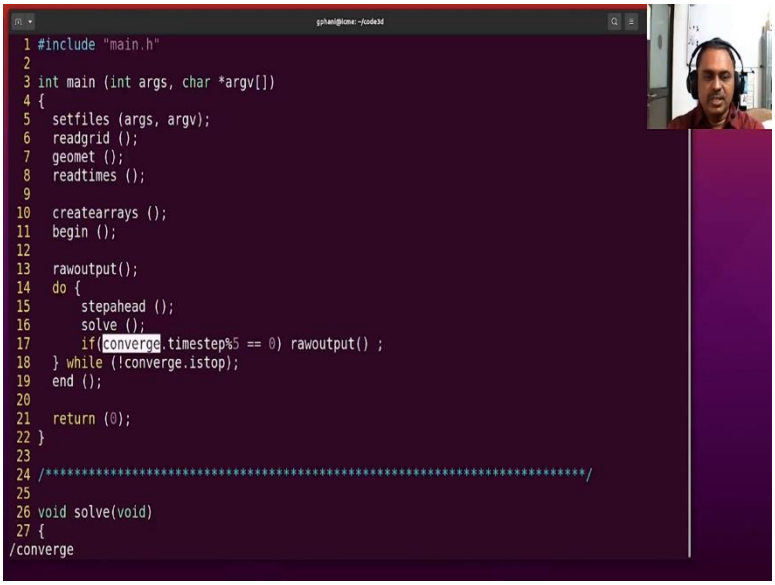
Now, let us say that we want to also explore this further. So, Ctrl F would scroll the page downwards. So, let me go to the first line, and let me also set the numbers so you can see that I am in the 27th line at the bottom of my screen. So, when I press Ctrl F you see that 27th line is at the top of the screen and one whole screen has been scrawled.

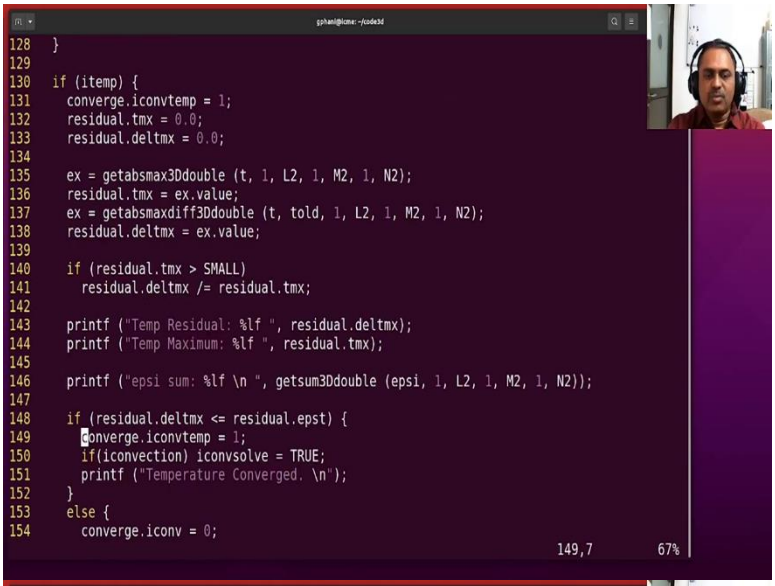
Now, I want to scroll only half a screen. So, I could do that by using Ctrl D. So, you can see that I am calling only half of the screen, Ctrl D would be down half Ctrl U will be up half up half. So, you could call either full screens or you could call half screens, and you can always go to a specific line. So, let us say at 128th line, there is an error so I can press colon 128 and go exactly to that line.

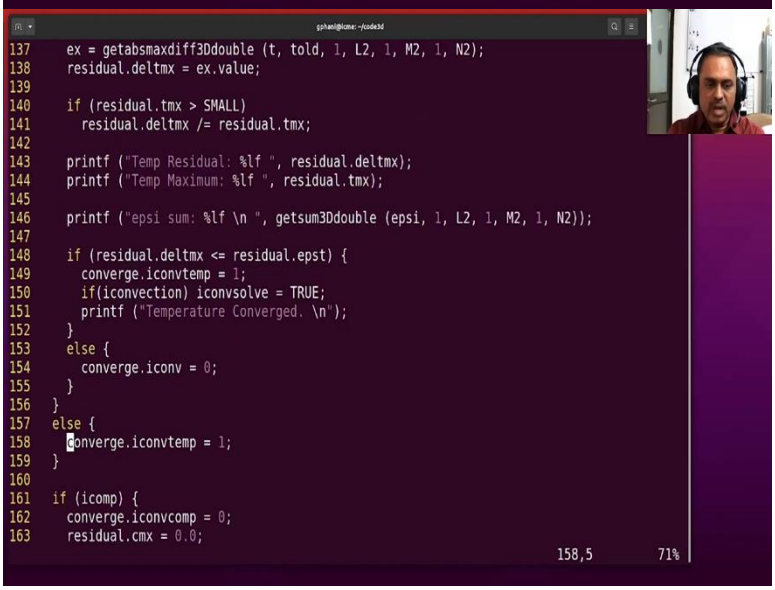
And you can see that the syntax highlighting is happening to show you the matching brace. So, it is useful for programmers to also identify the loops that are closing properly. And you can actually move up and down using the arrow keys, and then you can start making some changes to the text. So, I want to make let us say this value not 0 and 1, so I can press R to replace a character and the character I want to replace is 1, so I press 1 and press escape I am done.

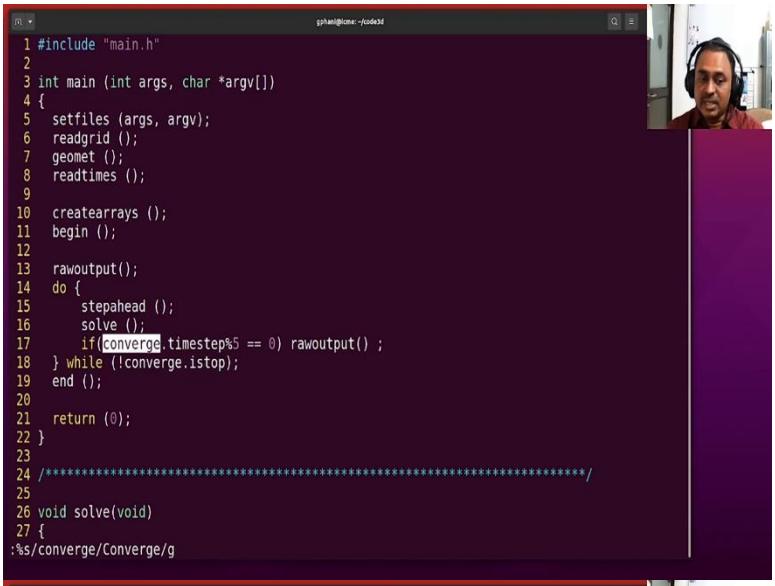
Now again, I can move around. So, you can see that we are able to make extremely precise editing into the file, but also able to move around quite conveniently in a visual manner. So, Vi editor that way is quite convenient.

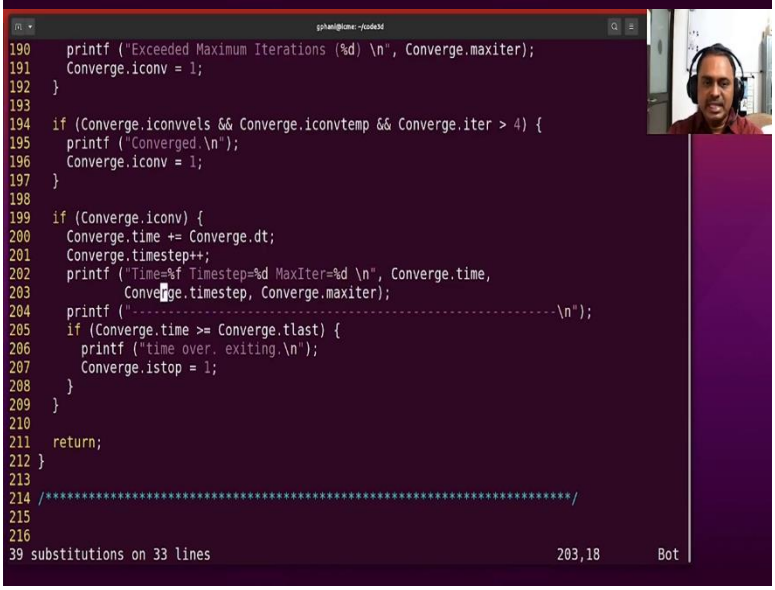
(Refer Slide Time: 06:19)

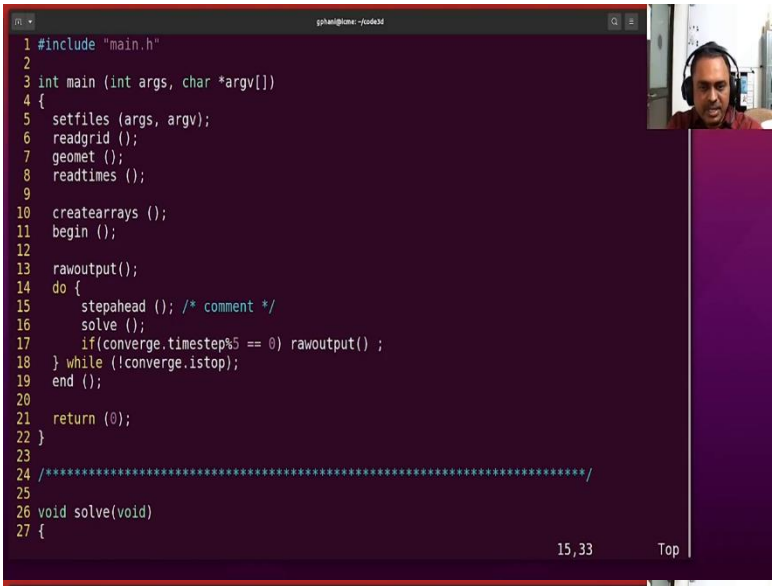


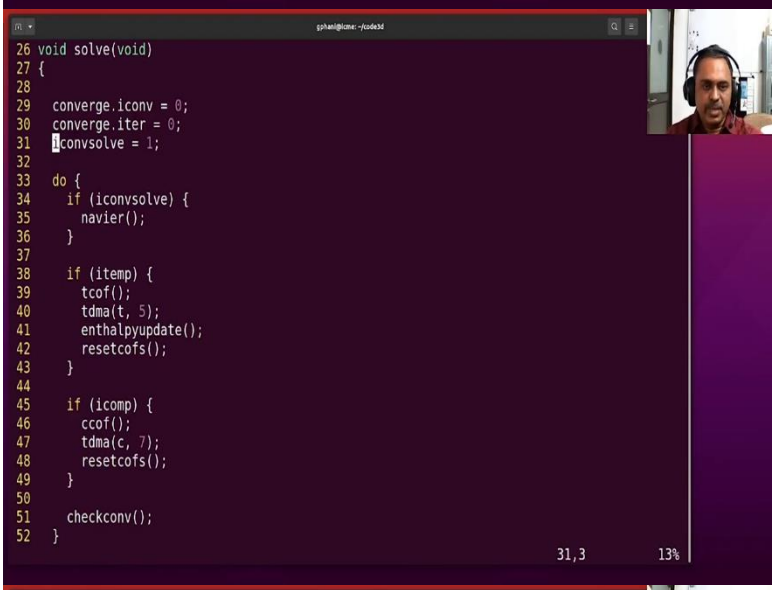

gphani@icme: ~/code3d
128 }
129
130 if (itemp) {
131 converge.iconvtemp = 1;
132 residual.tmx = 0.0;
133 residual.deltmx = 0.0;
134
135 ex = getabsmax3Ddouble (t, 1, L2, 1, M2, 1, N2);
136 residual.tmx = ex.value;
137 ex = getabsmaxdiff3Ddouble (t, told, 1, L2, 1, M2, 1, N2);
138 residual.deltmx = ex.value;
139
140 if (residual.tmx > SMALL)
141 residual.deltmx /= residual.tmx;
142
143 printf ("Temp Residual: %lf ", residual.deltmx);
144 printf ("Temp Maximum: %lf ", residual.tmx);
145
146 printf ("epsi sum: %lf \n ", getsum3Ddouble (epsi, 1, L2, 1, M2, 1, N2));
147
148 if (residual.deltmx <= residual.epst) {
149 converge.iconvtemp = 1;
150 if(iconvection) iconvsolve = TRUE;
151 printf ("Temperature Converged. \n");
152 }
153 else {
154 converge.iconv = 0;
149,7 67%

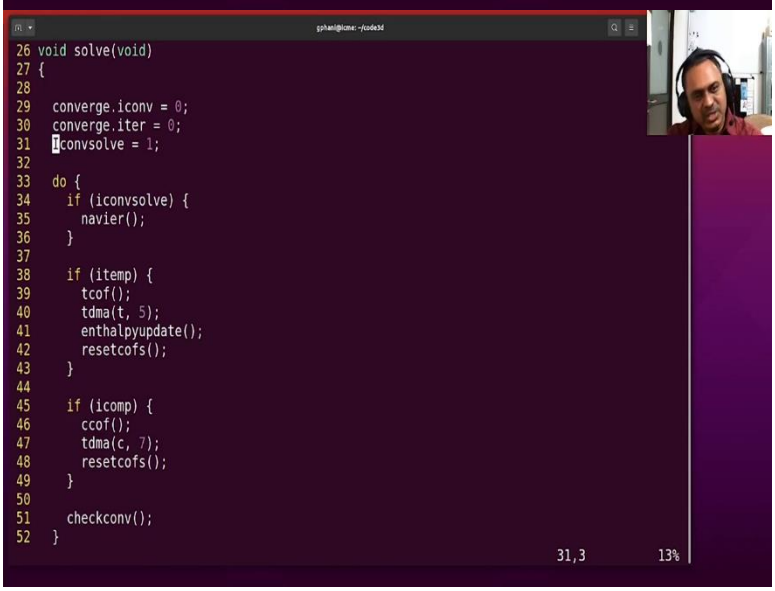

gphani@icme: ~/code3d
137 ex = getabsmaxdiff3Ddouble (t, told, 1, L2, 1, M2, 1, N2);
138 residual.deltmx = ex.value;
139
140 if (residual.tmx > SMALL)
141 residual.deltmx /= residual.tmx;
142
143 printf ("Temp Residual: %lf ", residual.deltmx);
144 printf ("Temp Maximum: %lf ", residual.tmx);
145
146 printf ("epsi sum: %lf \n ", getsum3Ddouble (epsi, 1, L2, 1, M2, 1, N2));
147
148 if (residual.deltmx <= residual.epst) {
149 converge.iconvtemp = 1;
150 if(iconvection) iconvsolve = TRUE;
151 printf ("Temperature Converged. \n");
152 }
153 else {
154 converge.iconv = 0;
155 }
156 }
157 else {
158 converge.iconvtemp = 1;
159 }
160
161 if (icomp) {
162 converge.iconvcomp = 0;
163 residual.cmx = 0.0;
158,5 71%

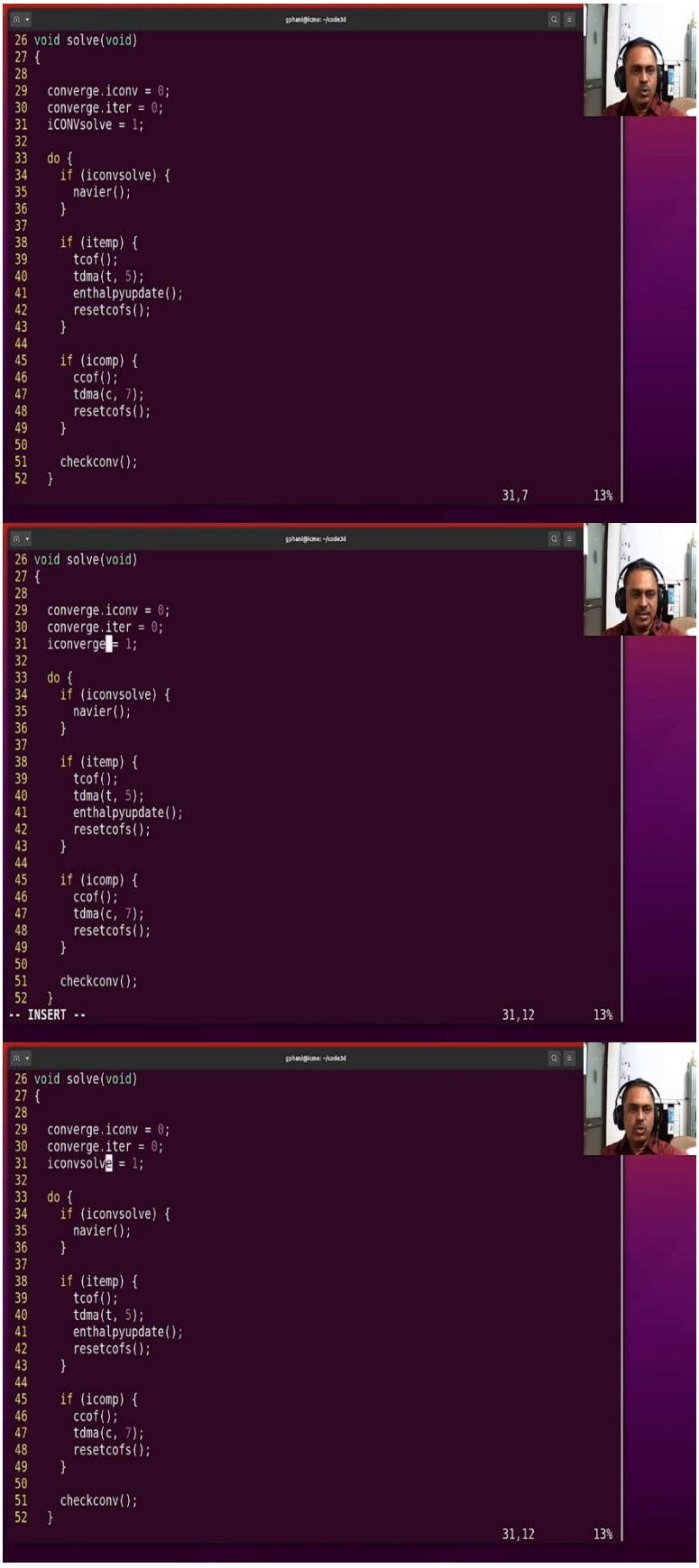

gphani@icme: ~/code3d
#include "main.h"
int main (int args, char *argv[])
{
setfiles (args, argv);
readgrid ();
geomet ();
readtimes ();
createarrays ();
begin ();
rawoutput();
do {
stepahead ();
solve ();
if(converge.timestep%5 == 0) rawoutput() ;
} while (!converge.istop);
end ();
return (0);
}
/***/
void solve(void)
{
:%s/converge/Converge/g


gphani@icme: ~/code3d
printf ("Exceeded Maximum Iterations (%d) \n", Converge.maxiter);
Converge.iconv = 1;
}
if (Converge.iconvvels && Converge.iconvtemp && Converge.iter > 4) {
printf ("Converged.\n");
Converge.iconv = 1;
}
if (Converge.iconv) {
Converge.time += Converge.dt;
Converge.timestep++;
printf ("Time=%f Timestep=%d MaxIter=%d \n", Converge.time,
Converge.timestep, Converge.maxiter);
printf ("--\n");
if (Converge.time >= Converge.tlast) {
printf ("time over. exiting.\n");
Converge.istop = 1;
}
}
return;
}
/***/
39 substitutions on 33 lines
203,18 Bot


gphani@icme: ~/code3d
#include "main.h"
int main (int args, char *argv[])
{
setfiles (args, argv);
readgrid ();
geomet ();
readtimes ();
createarrays ();
begin ();
rawoutput();
do {
stepahead (); /* comment */
solve ();
if(converge.timestep%5 == 0) rawoutput() ;
} while (!converge.istop);
end ();
return (0);
}
/***/
void solve(void)
{
15,33 Top


gphani@icme: ~/code3d
void solve(void)
{
converge.iconv = 0;
converge.iter = 0;
iconvsolve = 1;
do {
if (iconvsolve) {
navier();
}
if (itemp) {
tcof();
tdma(t, 5);
enthalpyupdate();
resetcofs();
}
if (icomp) {
ccof();
tdma(c, 7);
resetcofs();
}
checkconv();
}
31,3 13%


gphani@icme: ~/code3d
void solve(void)
{
converge.iconv = 0;
converge.iter = 0;
iconvsolve = 1;
do {
if (iconvsolve) {
navier();
}
if (itemp) {
tcof();
tdma(t, 5);
enthalpyupdate();
resetcofs();
}
if (icomp) {
ccof();
tdma(c, 7);
resetcofs();
}
checkconv();
}
31,3 13%



I go to the last line. And now let us say that we look at some variables. So, there is a structure called converge, which has been used here. So, you can see converge is the name of the

structure, and I want to name that converge structure to something else. So, I will go and check where all that word comes, so slash converge. And you see that I am able to press now n to check wherever it comes.

So, I ensure that it is available only, as part of the structure, and not in, not as a part of any function name, and look around and ensure that it is occurring only as name of the structure alone. So, once I confirm, then what I can do, is that, I can go ahead and replace it, so colon percentage substitute converge to something else name. Let us say I happen to rename it to capital Converge, because that is what is currently given in the input file, let us say, so I can apply this change everywhere in the file. And you see that everywhere the converge has been changed to capital C.

So, we can do some variable name changes in one go everywhere or you can see 39 substitutions on 33 lines have been affected with just one command. So that is a power of Vi editor, which I would say is available, perhaps, only with emacs, but any other editor would not make it that easy. And I could also do U to undo the change.

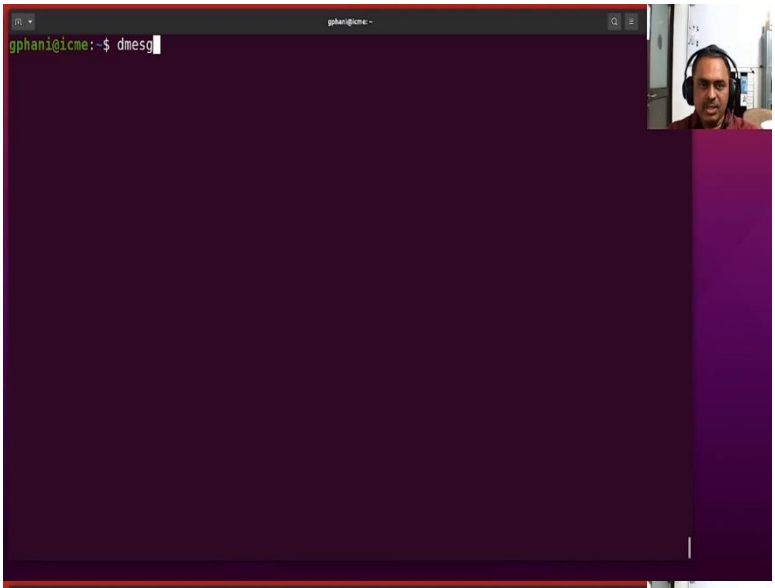
Now, we could also see the power of it by seeing that we are able to edit it in a convenient manner. So, I want to append something at the end. I press capital A, so I go to the end of the line and start appending. So, I have a comment here. Then I go to the beginning of the line pressing 0. You can replace one single character by pressing r. So, I press r, the i will be changed to let us say capital I and then escape.

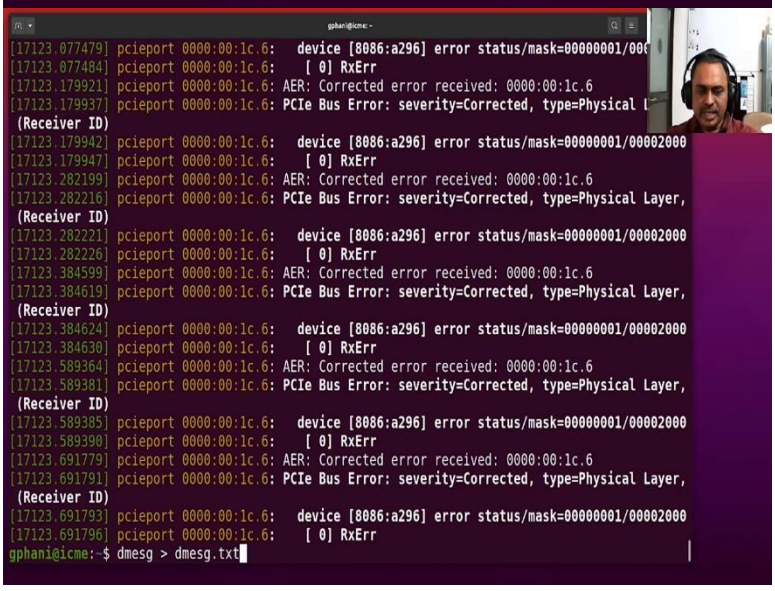
So, you can change one character at a time. You could also change until you press escape, so I can use it by capital R. So, in the command mode, I press escape to ensure that I am in the command mode, and then shift R which means that until I press escape, I will be replacing the characters, and I can do that by saying that okay, i then C, O, N so I can keep on replacing the characters. And I press escape that is I am done with the replacement. So, you can see that the editing can happen by replacement of characters without disturbing the layout of the characters in the file.

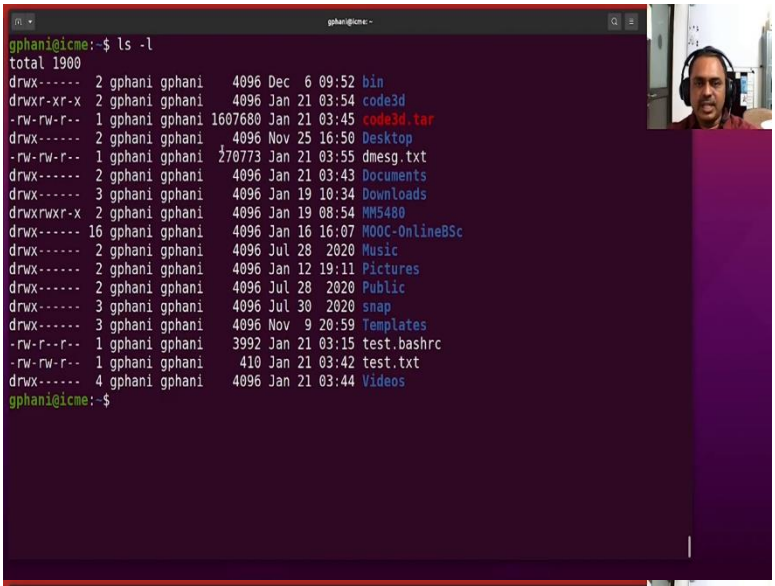
So, for input files, which are very specific with respect to the positioning and formatting, then very precise editing can be done using Vi editor. And you can go to the beginning and use the arrow keys to navigate. And let us say I want to replace this word I can press a cw to replace one single word cw and then I can press like that. And I can also, I can press a cw, and I can press escape and done with editing. So, you can see that you can change one word fully and it

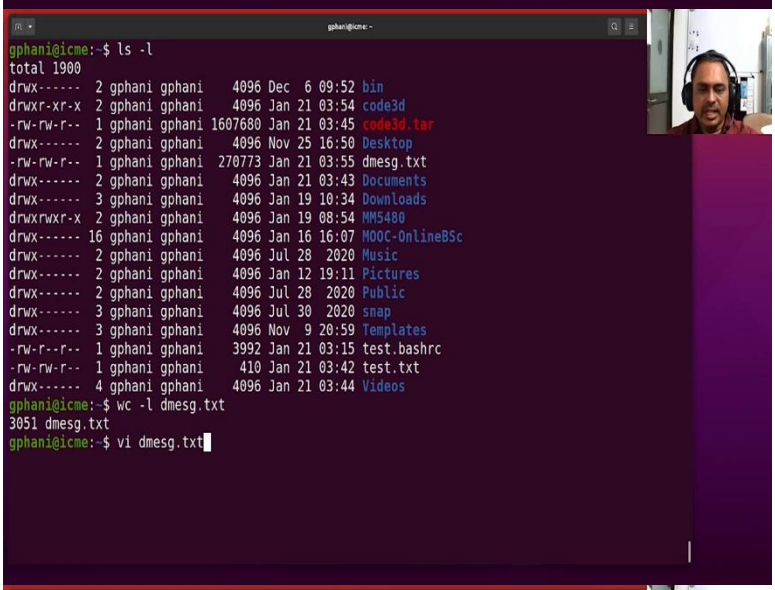
will affect only that word and leave the blank after that as a word boundary. So, you can actually change one word at a time which is a very precise way of editing the source code.

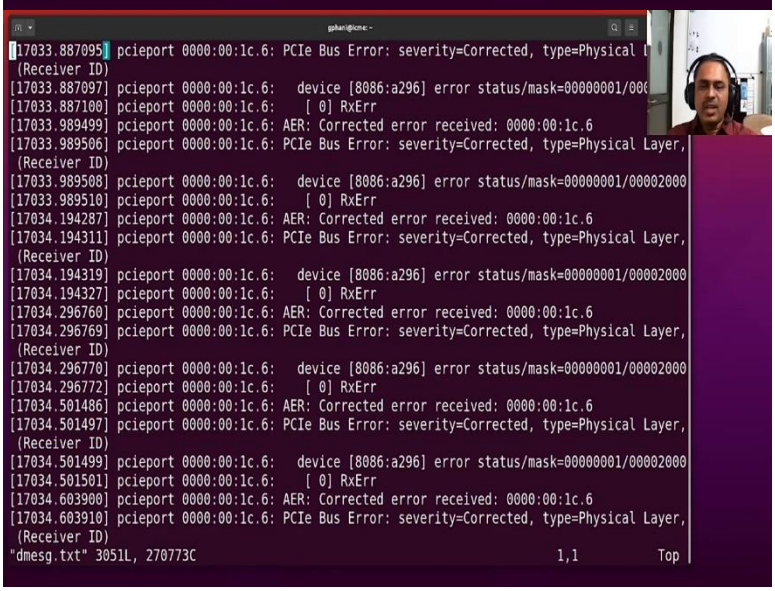
(Refer Slide Time: 09:52)

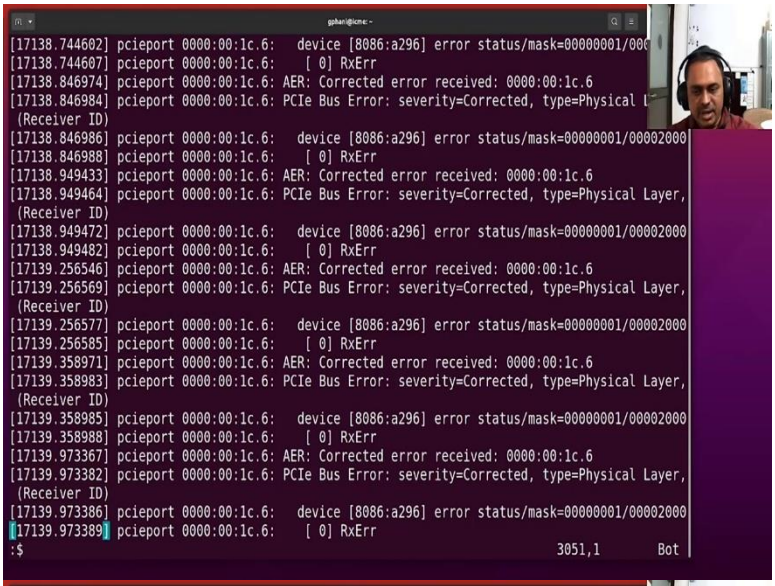


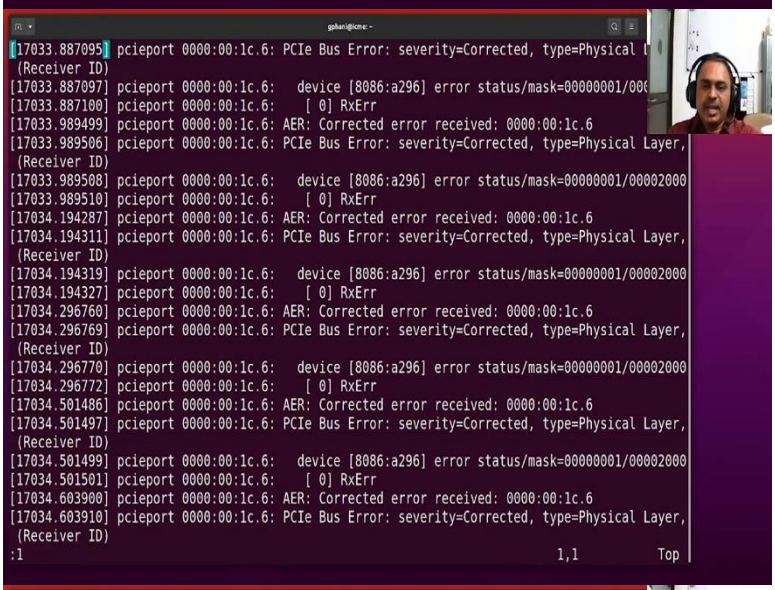


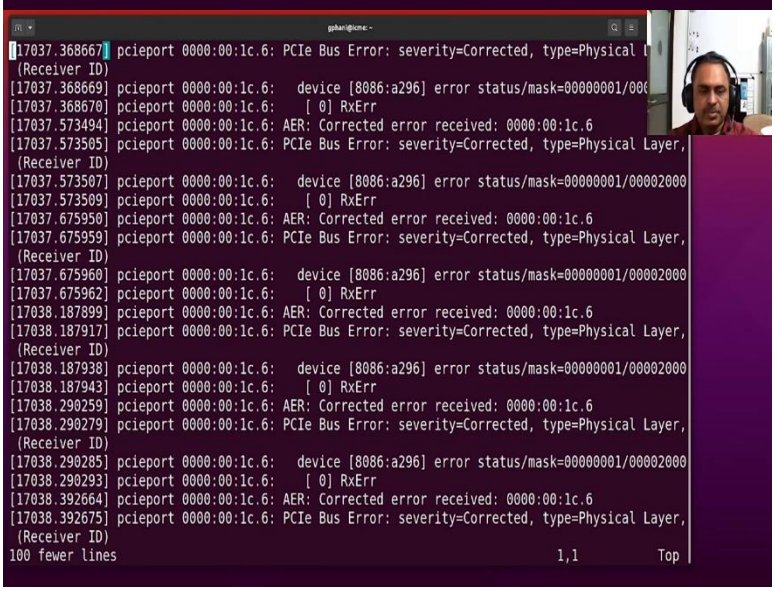

gphani@icme: ~
gphani@icme:~$ ls -l
total 1900
drwx------ 2 gphani gphani   4096 Dec 6 09:52 bin
drwxr-xr-x 2 gphani gphani   4096 Jan 21 03:54 code3d
-rw-rw-r-- 1 gphani gphani 1607680 Jan 21 03:45 code3d.tar
drwx------ 2 gphani gphani   4096 Nov 25 16:50 Desktop
-rw-rw-r-- 1 gphani gphani 270773 Jan 21 03:55 dmesg.txt
drwx------ 2 gphani gphani   4096 Jan 21 03:43 Documents
drwx------ 3 gphani gphani   4096 Jan 19 10:34 Downloads
drwxrwxr-x 2 gphani gphani   4096 Jan 19 08:54 MM5480
drwx------ 16 gphani gphani   4096 Jan 16 16:07 MOOC-OnlineBSc
drwx------ 2 gphani gphani   4096 Jul 28 2020 Music
drwx------ 2 gphani gphani   4096 Jan 12 19:11 Pictures
drwx------ 2 gphani gphani   4096 Jul 28 2020 Public
drwx------ 3 gphani gphani   4096 Jul 30 2020 snap
drwx------ 3 gphani gphani   4096 Nov 9 20:59 Templates
-rw-r--r-- 1 gphani gphani   3992 Jan 21 03:15 test.bashrc
-rw-rw-r-- 1 gphani gphani   410 Jan 21 03:42 test.txt
drwx------ 4 gphani gphani   4096 Jan 21 03:44 Videos
gphani@icme:~$

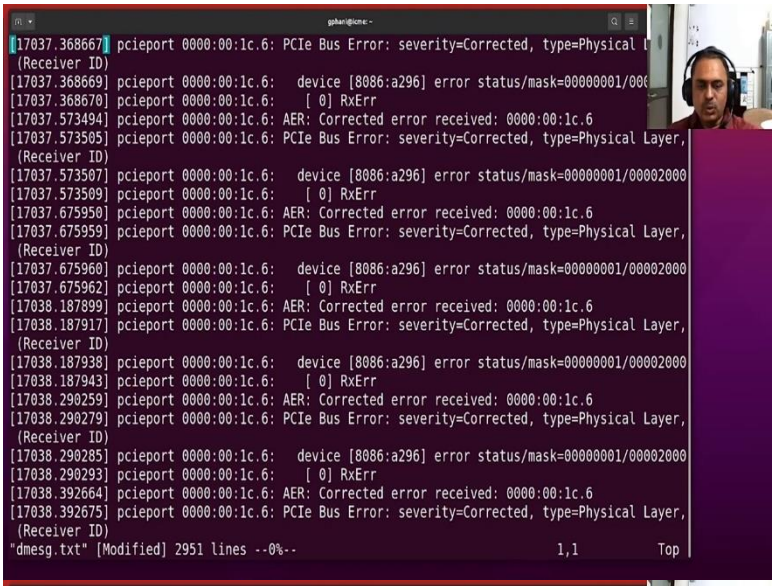

gphani@icme: ~
gphani@icme:~$ ls -l
total 1900
drwx------ 2 gphani gphani   4096 Dec 6 09:52 bin
drwxr-xr-x 2 gphani gphani   4096 Jan 21 03:54 code3d
-rw-rw-r-- 1 gphani gphani 1607680 Jan 21 03:45 code3d.tar
drwx------ 2 gphani gphani   4096 Nov 25 16:50 Desktop
-rw-rw-r-- 1 gphani gphani 270773 Jan 21 03:55 dmesg.txt
drwx------ 2 gphani gphani   4096 Jan 21 03:43 Documents
drwx------ 3 gphani gphani   4096 Jan 19 10:34 Downloads
drwxrwxr-x 2 gphani gphani   4096 Jan 19 08:54 MM5480
drwx------ 16 gphani gphani   4096 Jan 16 16:07 MOOC-OnlineBSc
drwx------ 2 gphani gphani   4096 Jul 28 2020 Music
drwx------ 2 gphani gphani   4096 Jan 12 19:11 Pictures
drwx------ 2 gphani gphani   4096 Jul 28 2020 Public
drwx------ 3 gphani gphani   4096 Jul 30 2020 snap
drwx------ 3 gphani gphani   4096 Nov 9 20:59 Templates
-rw-r--r-- 1 gphani gphani   3992 Jan 21 03:15 test.bashrc
-rw-rw-r-- 1 gphani gphani   410 Jan 21 03:42 test.txt
drwx------ 4 gphani gphani   4096 Jan 21 03:44 Videos
gphani@icme:~$ wc -l dmesg.txt
3051 dmesg.txt
gphani@icme:~$ vi dmesg.txt

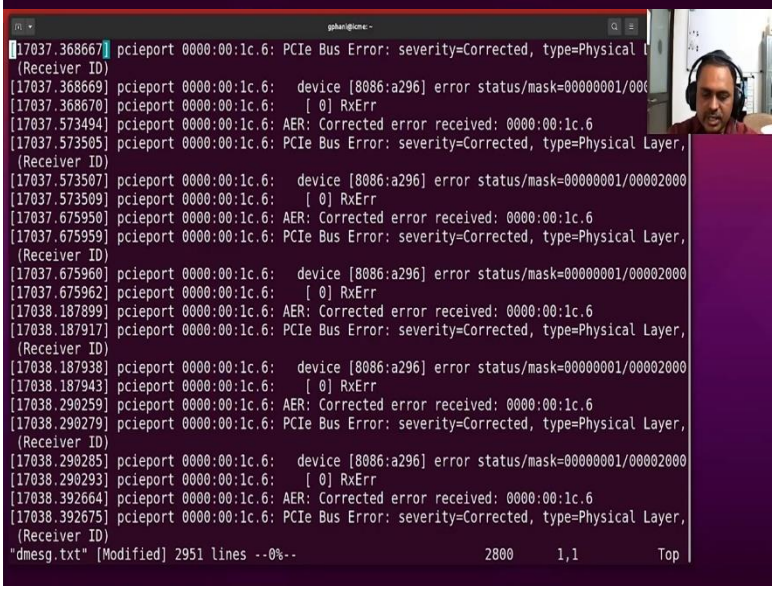

gphani@icme: ~
[17033.887095] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical L
 (Receiver ID)
[17033.887097] pcieport 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/000
[17033.887100] pcieport 0000:00:1c.6:   [0] RxErr
[17033.989499] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17033.989506] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
 (Receiver ID)
[17033.989508] pcieport 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/00002000
[17033.989510] pcieport 0000:00:1c.6:   [0] RxErr
[17034.194287] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17034.194311] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
 (Receiver ID)
[17034.194319] pcieport 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/00002000
[17034.194327] pcieport 0000:00:1c.6:   [0] RxErr
[17034.296760] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17034.296769] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
 (Receiver ID)
[17034.296770] pcieport 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/00002000
[17034.296772] pcieport 0000:00:1c.6:   [0] RxErr
[17034.501486] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17034.501497] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
 (Receiver ID)
[17034.501499] pcieport 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/00002000
[17034.501501] pcieport 0000:00:1c.6:   [0] RxErr
[17034.603900] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17034.603910] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
 (Receiver ID)
"dmesg.txt" 3051L, 270773C
1,1
Top

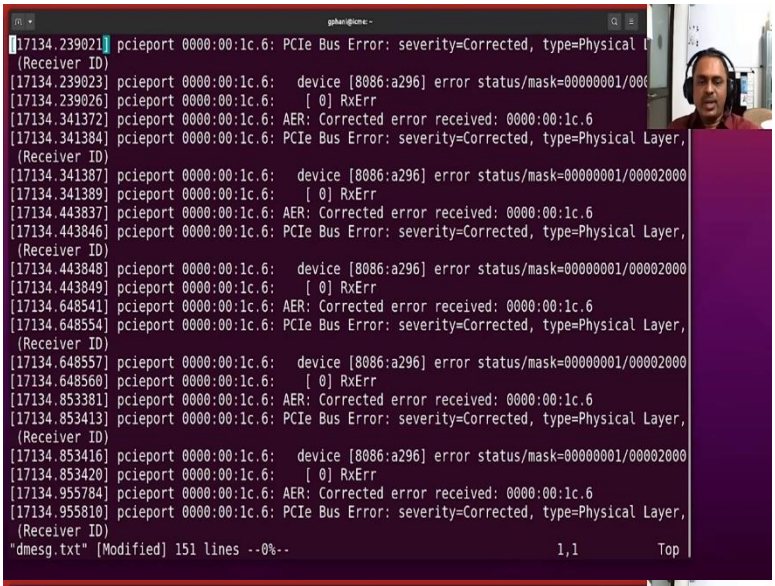

[17138.744602] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/000
[17138.744607] pcieport 0000:00:1c.6: [0] RxErr
[17138.846974] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17138.846984] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical L
(Receiver ID)
[17138.846986] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17138.846988] pcieport 0000:00:1c.6: [0] RxErr
[17138.949433] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17138.949464] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17138.949472] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17138.949482] pcieport 0000:00:1c.6: [0] RxErr
[17139.256546] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17139.256569] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17139.256577] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17139.256585] pcieport 0000:00:1c.6: [0] RxErr
[17139.358971] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17139.358983] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17139.358985] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17139.358988] pcieport 0000:00:1c.6: [0] RxErr
[17139.973367] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17139.973382] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17139.973386] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17139.973389] pcieport 0000:00:1c.6: [0] RxErr
:$
3051,1 Bot

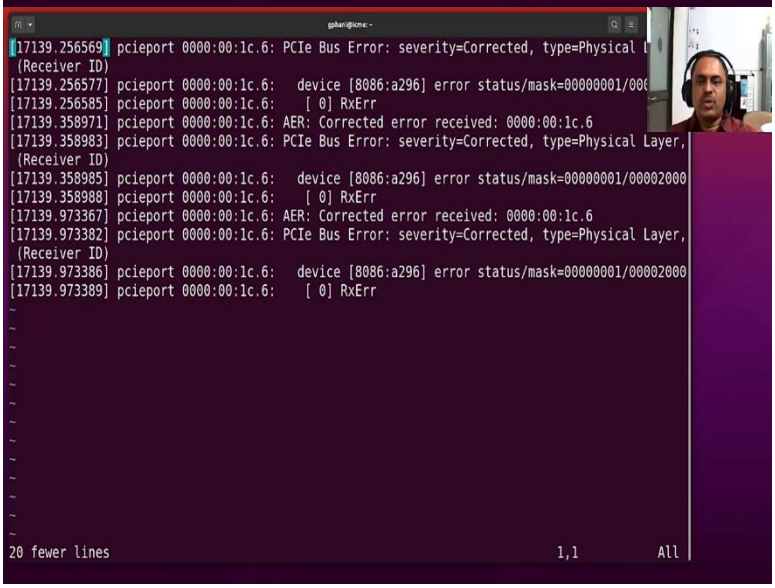

[17033.887095] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical L
(Receiver ID)
[17033.887097] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/000
[17033.887100] pcieport 0000:00:1c.6: [0] RxErr
[17033.989499] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17033.989506] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17033.989508] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17033.989510] pcieport 0000:00:1c.6: [0] RxErr
[17034.194287] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17034.194311] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17034.194319] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17034.194327] pcieport 0000:00:1c.6: [0] RxErr
[17034.296760] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17034.296769] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17034.296770] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17034.296772] pcieport 0000:00:1c.6: [0] RxErr
[17034.501486] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17034.501497] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17034.501499] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17034.501501] pcieport 0000:00:1c.6: [0] RxErr
[17034.603900] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17034.603910] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
:1
1,1 Top

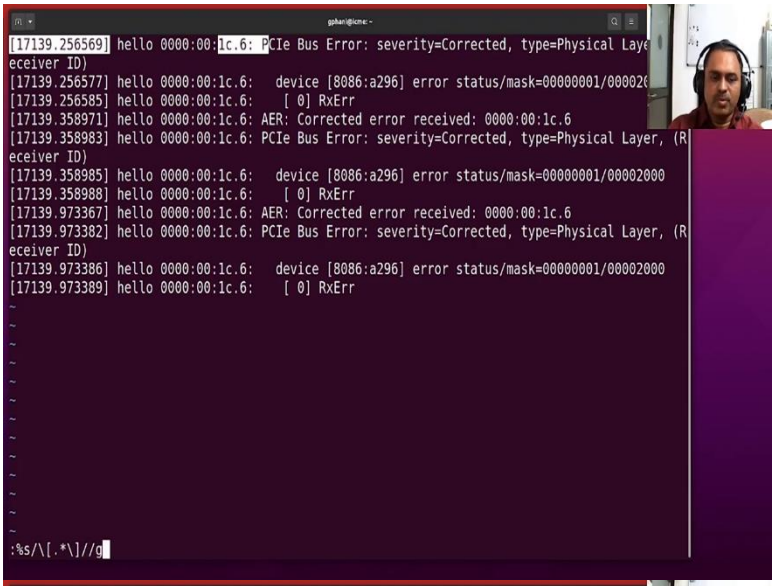

[17037.368667] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical L
(Receiver ID)
[17037.368669] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/000
[17037.368670] pcieport 0000:00:1c.6: [0] RxErr
[17037.573494] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17037.573505] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17037.573507] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17037.573509] pcieport 0000:00:1c.6: [0] RxErr
[17037.675950] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17037.675959] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17037.675960] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17037.675962] pcieport 0000:00:1c.6: [0] RxErr
[17038.187899] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17038.187917] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17038.187938] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17038.187943] pcieport 0000:00:1c.6: [0] RxErr
[17038.290259] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17038.290279] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17038.290285] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17038.290293] pcieport 0000:00:1c.6: [0] RxErr
[17038.392664] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17038.392675] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
100 fewer lines
1,1 Top

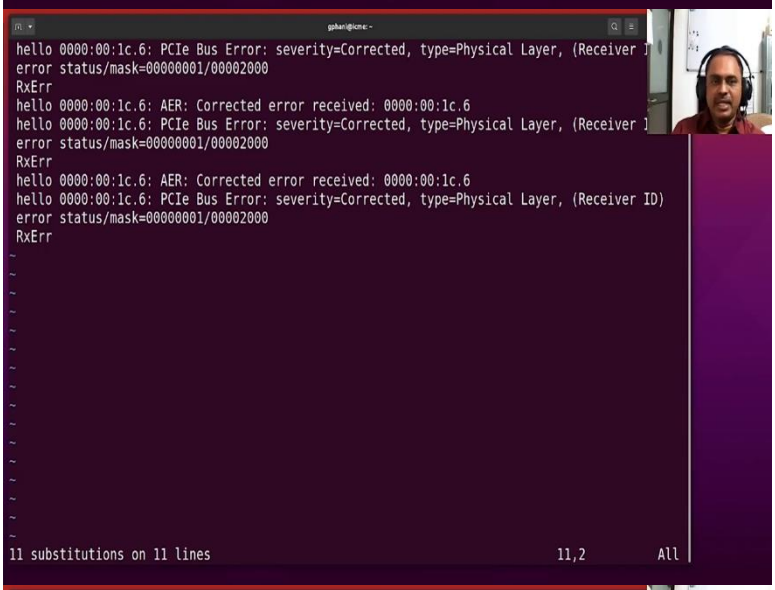

gpbari@icm:~
[17037.368667] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical L
(Receiver ID)
[17037.368669] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/000
[17037.368670] pcieport 0000:00:1c.6: [0] RxErr
[17037.573494] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17037.573505] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17037.573507] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17037.573509] pcieport 0000:00:1c.6: [0] RxErr
[17037.675950] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17037.675959] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17037.675960] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17037.675962] pcieport 0000:00:1c.6: [0] RxErr
[17038.187899] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17038.187917] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17038.187938] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17038.187943] pcieport 0000:00:1c.6: [0] RxErr
[17038.290259] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17038.290279] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17038.290285] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17038.290293] pcieport 0000:00:1c.6: [0] RxErr
[17038.392664] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17038.392675] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
"dmesg.txt" [Modified] 2951 lines --0%-- 1,1 Top

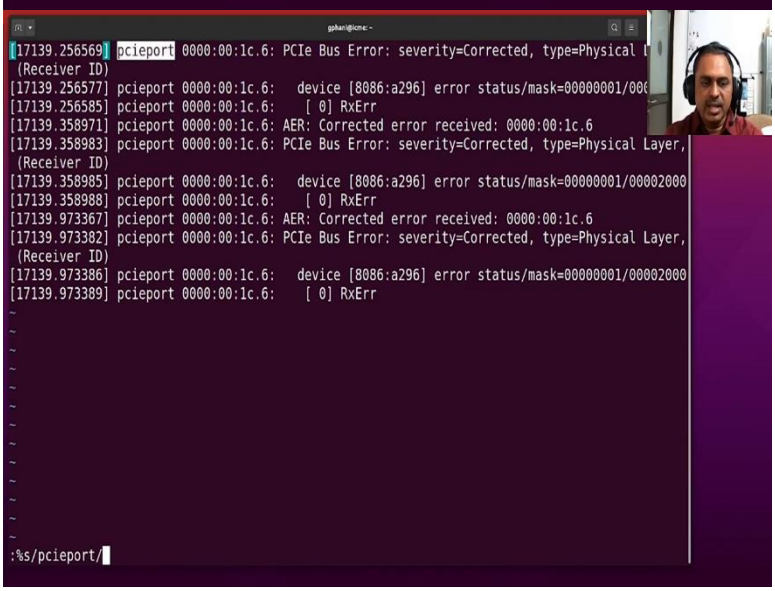

gpbari@icm:~
[17037.368667] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical L
(Receiver ID)
[17037.368669] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/000
[17037.368670] pcieport 0000:00:1c.6: [0] RxErr
[17037.573494] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17037.573505] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17037.573507] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17037.573509] pcieport 0000:00:1c.6: [0] RxErr
[17037.675950] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17037.675959] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17037.675960] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17037.675962] pcieport 0000:00:1c.6: [0] RxErr
[17038.187899] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17038.187917] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17038.187938] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17038.187943] pcieport 0000:00:1c.6: [0] RxErr
[17038.290259] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17038.290279] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17038.290285] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17038.290293] pcieport 0000:00:1c.6: [0] RxErr
[17038.392664] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17038.392675] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
"dmesg.txt" [Modified] 2951 lines --0%-- 2800 1,1 Top


gphani@icm-c: ~
[17134.239021] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical L
(Receiver ID)
[17134.239023] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/000
[17134.239026] pcieport 0000:00:1c.6: [0] RxErr
[17134.341372] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17134.341384] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17134.341387] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17134.341389] pcieport 0000:00:1c.6: [0] RxErr
[17134.443837] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17134.443846] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17134.443848] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17134.443849] pcieport 0000:00:1c.6: [0] RxErr
[17134.648541] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17134.648554] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17134.648557] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17134.648560] pcieport 0000:00:1c.6: [0] RxErr
[17134.853381] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17134.853413] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17134.853416] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17134.853420] pcieport 0000:00:1c.6: [0] RxErr
[17134.955784] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17134.955810] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
"dmesg.txt" [Modified] 151 lines --0%-- 1,1 Top


gphani@icm-c: ~
[17139.256569] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical L
(Receiver ID)
[17139.256577] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/000
[17139.256585] pcieport 0000:00:1c.6: [0] RxErr
[17139.358971] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17139.358983] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17139.358985] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17139.358988] pcieport 0000:00:1c.6: [0] RxErr
[17139.973367] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17139.973382] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17139.973386] pcieport 0000:00:1c.6: device [8086:a296] error status/mask=00000001/00002000
[17139.973389] pcieport 0000:00:1c.6: [0] RxErr
20 fewer lines 1,1 All


[17139.256569] hello 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Laye
eceiver ID)
[17139.256577] hello 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/000020
[17139.256585] hello 0000:00:1c.6:   [0] RxErr
[17139.358971] hello 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17139.358983] hello 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer, (R
eceiver ID)
[17139.358985] hello 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/00002000
[17139.358988] hello 0000:00:1c.6:   [0] RxErr
[17139.973367] hello 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17139.973382] hello 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer, (R
eceiver ID)
[17139.973386] hello 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/00002000
[17139.973389] hello 0000:00:1c.6:   [0] RxErr
:%s/\[.*\]//g


hello 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer, (Receiver I
error status/mask=00000001/00002000
RxErr
hello 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
hello 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer, (Receiver I
error status/mask=00000001/00002000
RxErr
hello 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
hello 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer, (Receiver ID)
error status/mask=00000001/00002000
RxErr
11 substitutions on 11 lines 11,2 All


[17139.256569] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical L
(Receiver ID)
[17139.256577] pcieport 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/000
[17139.256585] pcieport 0000:00:1c.6:   [0] RxErr
[17139.358971] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17139.358983] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17139.358985] pcieport 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/00002000
[17139.358988] pcieport 0000:00:1c.6:   [0] RxErr
[17139.973367] pcieport 0000:00:1c.6: AER: Corrected error received: 0000:00:1c.6
[17139.973382] pcieport 0000:00:1c.6: PCIe Bus Error: severity=Corrected, type=Physical Layer,
(Receiver ID)
[17139.973386] pcieport 0000:00:1c.6:   device [8086:a296] error status/mask=00000001/00002000
[17139.973389] pcieport 0000:00:1c.6:   [0] RxErr
:%s/pcieport/

Now let us say we want to edit a very large file, and that is again, where Vi editor is quite convenient. So, we have some output of a command like dmesg. So, let us look at that. So, dmesg if I type then there is a long output that is shown, this is all the error messages and alerts that are given by the system.

So, I want to just capture that into your file. So, I type greater than dmesg dot text. Now, look at the file size. So, you can see that it says, quite a big file no 270 kilobytes. So, how many lines are there in that wc minus l, dmesg dot text. So, you can see that there are 3000 lines. So, I can go ahead and load that in the text editor. And now I have got a lot of lines to play with. So, I can press cap Ctrl g to see the number of lines colon f to see the file name dollar to go to the last line 3051 lines, and again, 1 to go to the first line.

And let us say now, I want to delete 100 lines. So, I will press 100 followed by dd so that exactly 100 lines are deleted. So, I press 100dd, hundred fewer lines, and I press g to see that there are 2951 lines, so 100 lines have been deleted. Now, I can do that in a big way also. So, I want to delete let us say 2800 lines, so 2800dd. So, you can see 2800 lines have been deleted and Ctrl g you can see there are only 151 lines.

And so, you can actually see that the power of commands in Vi. So, if you prepend a number to it that command will be run so many times and therefore it is very powerful in editing a large file without the effort of actually scrolling through every line. So, we have got now 151 lines. So, I now delete another 100 lines, and then 20 lines, 20 lines. So now you can see that we have about only 11 lines.

Now, the window is shown here, so there are some tildas in the end. So, these are all basically characters that are indicating that the file content is over and up to here only the file content is the staff is just tilda to just show you that there is no content from the file within the window that has to be shown.

Now let us say in this file, I want to replace the word pcie port with hello. So, I can do that now colon percentage substitute pcieport, I replace it with hello. So, you can see that I have edited in one go policy that. Now, I want to also use the concept of regular expressions to find something, and then go on to change something. So, I want to find wherever there are four zeros followed by a colon and then two zeros I want to replace that with something, so that also I can try with the combination of regex and this.

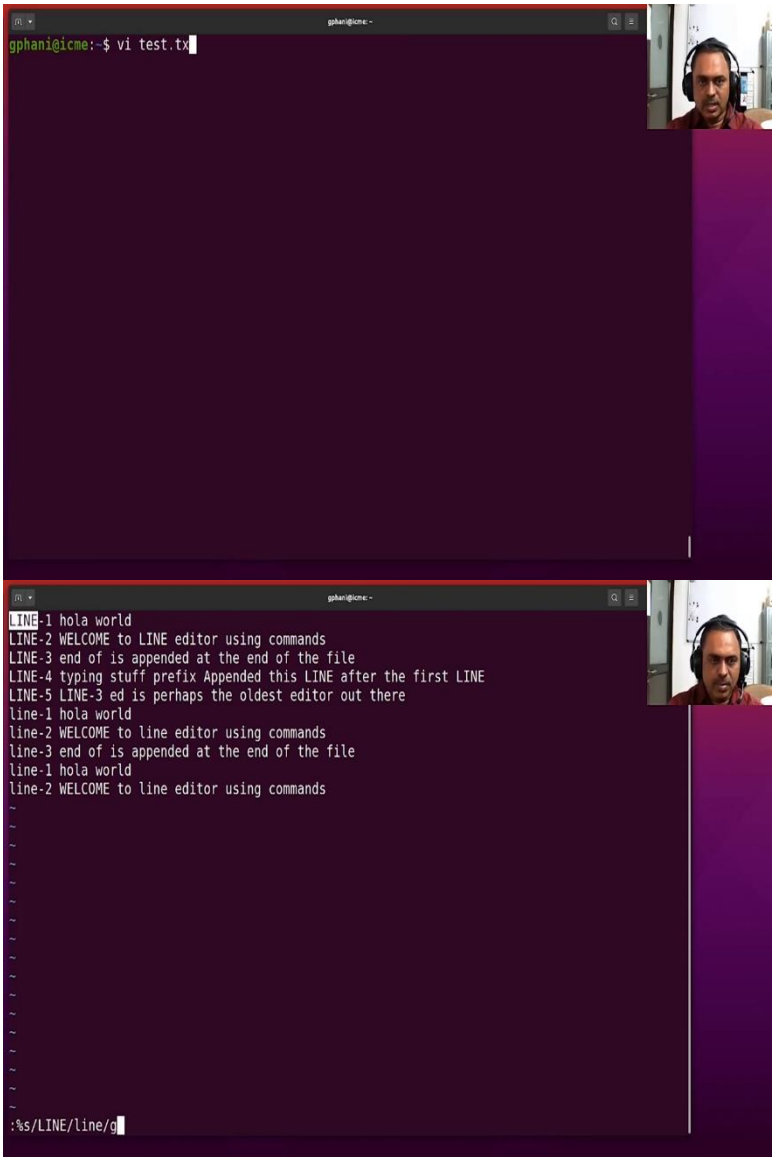
So, I would go by saying that, okay, there are four characters after that there is a colon and then there are two characters. So, already the highlighting is showing what is likely matched. Now this I would like to replace it with let us say null, okay, and you see that all those things have been modified exactly what we have intended. And I just undo, so, you can just verify that. Wherever 0000 colon 00 is there all that has been nullified. But you can also see that it has done beyond that because here also it would match.

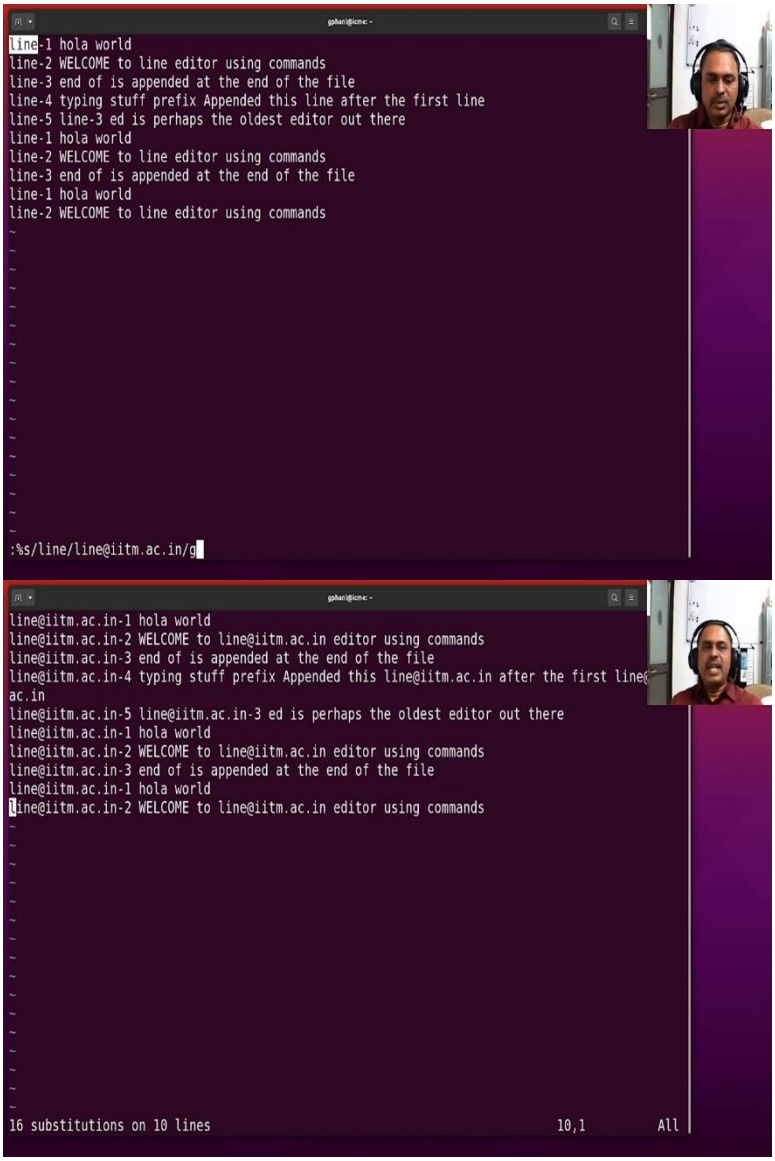
So, wherever it has matched with the regular expression, it has gone ahead and done. So, I will do it and show you there is one more coming up here because it has matched with these also. So, a regular expression that way, if you understand well, it would help you understand where all the changes can occur.

Now, you can also do that by searching so press forward slash dot dot, dot, dot, colon dot, dot, so wherever the pattern is there that match. So that is a first match, this is a second match, third match, fourth match fifth sixth match, you can see that where all it gets matched and therefore you know, where all it will actually go in to do the change. And this is something that you can also learn to be alert by becoming more and more familiar with the regular expressions.

And you want to remove whatever is in the square brackets in the beginning that also we could do now. So, you know that square brackets have special meaning in the regular expression language, so therefore, we are escaping that with a backslash, and I want to remove whatever is there in that square bracket, so I just removed it with the null and you see that that entire part has been deleted. So, you can do massive editing by understanding the command line aspect of Vi editor on any file, log file or whatever, and do these kinds of operations.

(Refer Slide Time: 15:18)

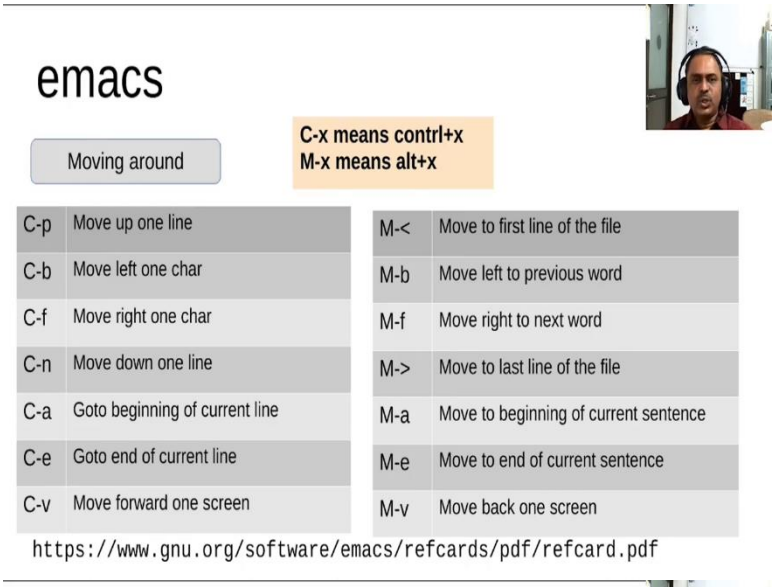


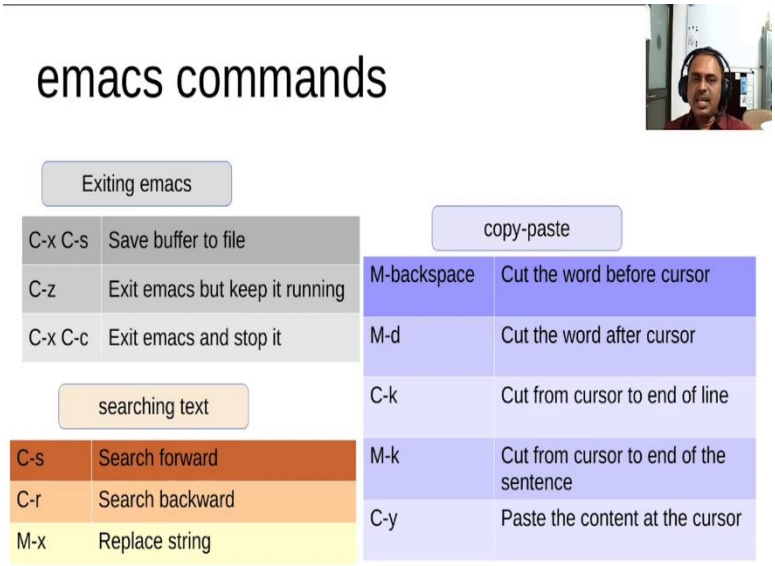


So, now I will show you something that is very cute, which is interesting for you to understand how to use Vi editor to do some manipulations of the text. So, I go to the test dot text, and here I would like to change the capital lines, I have made all of those files. Now let us say the first four words, I want to convert them to look like an email address, let us say, so I could do that substitute line, and I want to change that to look like, and you see that the entire text has been modified to look like an email address.

So, we can actually go ahead and do these kinds of manipulations to text, how many other lines are there even if it is running into hundreds and thousands of lines, the Vi editor will be able to do those changes within few seconds, because the comments are rather fast. And you can actually prepare your input file for further processing using various other commands, so some commands can be run within the text editor itself to prepare the input file for some other processing beyond the editor.

(Refer Slide Time: 16:45)





Now the third editor that we would like to look at in the command line environment is emacs, which is also very popular. And here there is only one mode in which the editor will work. And every command is actually going to be either a control plus a character or Alt plus a character. So, C hyphen is used to mean that it is Ctrl plus that character. So, C-p means Ctrl plus p, C-b means Ctrl plus b, C-f means Ctrl plus f, okay.

So, you have commands basically either control plus something or meta key or Alt key plus something. So, in that way, when you press the regular keys you are basically doing the inputting of the characters for your text file, but when you are pressing Ctrl or Alt it means that you are going to do some operations, running commands and moving around, etc. So therefore, there is only one mode in which way it is very different from Vi editor, which has three different modes in which it is running. And here I am giving you some summary, which

we could actually explore in a moment. And you could look at the reference card from the gnu website for a quick summary of various options in the emacs.

And here are some major features that we would like to look at. So, first thing that we need to know when we enter a editor is to learn how to come out. So as soon as you enter, if you want to look around, and then you want to come out Ctrl X, Ctrl C would mean that you would come out of the emacs editor.

And if you happen to make some changes and save it, then Ctrk X and Ctrk S. And if you want to just suspend the emacs editor, but just come out to something else, so Ctrl z would actually help you to just come out quickly to do some other command line work that you may have on the shell. And the search and replace aspects are also available in emacs. You could also copy paste text in emacs, so in many ways it is as powerful as the Vi editor. So, let us try it out to see how it looks like in the terminal.

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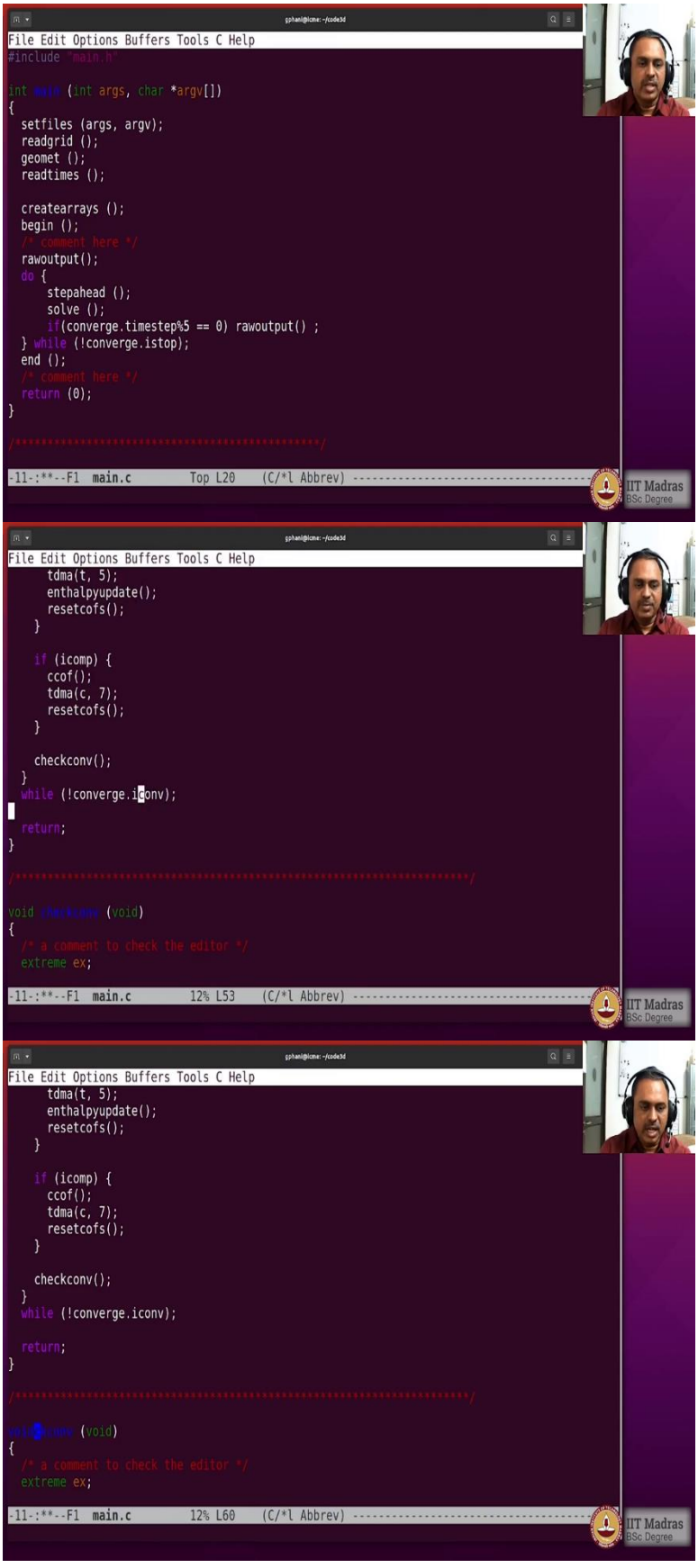

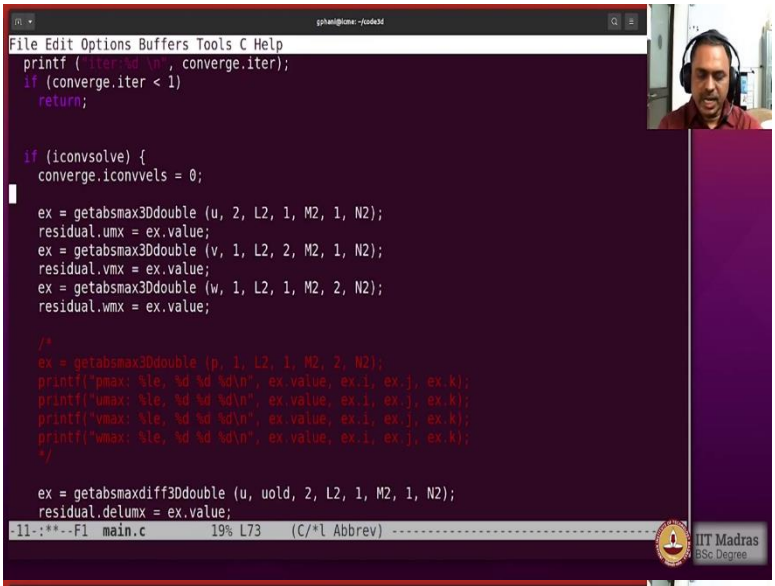
gphani@icme: ~/code3d
File Edit Options Buffers Tools C Help
printf ("iter:%d \n", converge.iter);
if (converge.iter < 1)
return;
if (iconvsolve) {
converge.iconvvels = 0;
ex = getabsmax3Ddouble (u, 2, L2, 1, M2, 1, N2);
residual.umx = ex.value;
ex = getabsmax3Ddouble (v, 1, L2, 2, M2, 1, N2);
residual.vmx = ex.value;
ex = getabsmax3Ddouble (w, 1, L2, 1, M2, 2, N2);
residual.wmx = ex.value;
/*
ex = getabsmax3Ddouble (p, 1, L2, 1, M2, 2, N2);
printf("pmax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
printf("umax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
printf("vmax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
printf("wmax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
*/
ex = getabsmaxdiff3Ddouble (u, uold, 2, L2, 1, M2, 1, N2);
residual.delumx = ex.value;
-11-:**--F1 main.c 19% L73 (C/*l Abbrev)
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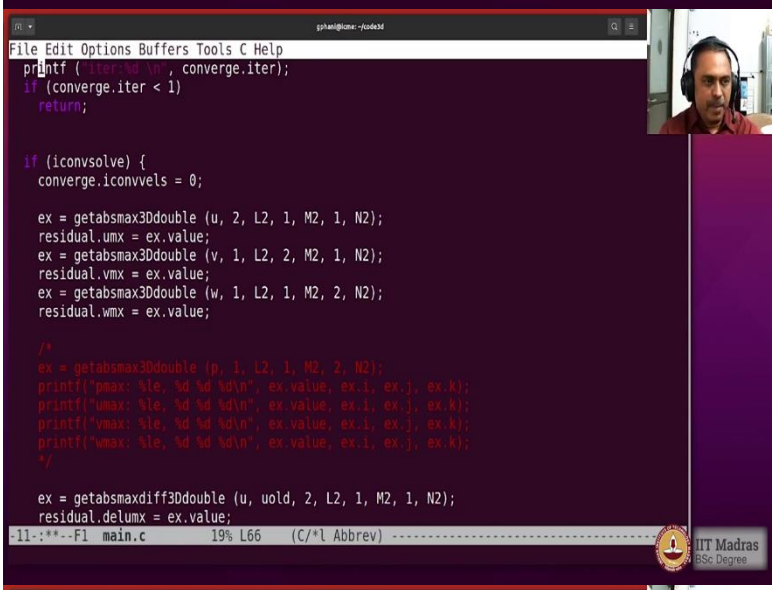
gphani@icme: ~/code3d
File Edit Options Buffers Tools C Help
printf ("iter:%d \n", converge.iter);
if (converge.iter < 1)
return;
if (iconvsolve) {
converge.iconvvels = 0;
ex = getabsmax3Ddouble (u, 2, L2, 1, M2, 1, N2);
residual.umx = ex.value;
ex = getabsmax3Ddouble (v, 1, L2, 2, M2, 1, N2);
residual.vmx = ex.value;
ex = getabsmax3Ddouble (w, 1, L2, 1, M2, 2, N2);
residual.wmx = ex.value;
/*
ex = getabsmax3Ddouble (p, 1, L2, 1, M2, 2, N2);
printf("pmax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
printf("umax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
printf("vmax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
printf("wmax: %le, %d %d %d\n", ex.value, ex.i, ex.j, ex.k);
*/
ex = getabsmaxdiff3Ddouble (u, uold, 2, L2, 1, M2, 1, N2);
residual.delumx = ex.value;
-11-:**--F1 main.c 19% L66 (C/*l Abbrev)
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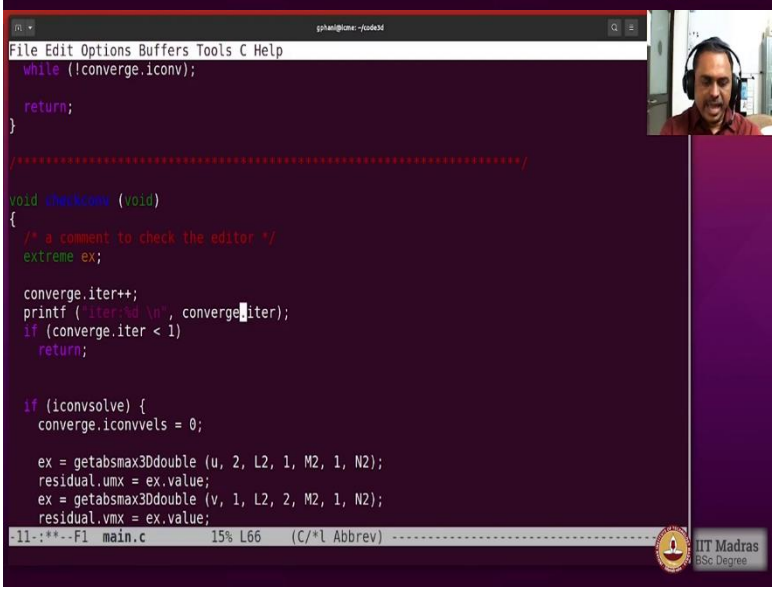
BSc Degree


gphani@icme: ~/code3d
File Edit Options Buffers Tools C Help
while (!converge.iconv);
return;
}
/***/
void checkconv (void)
{
/* a comment to check the editor */
extreme ex;
converge.iter++;
printf ("iter:%d \n", converge.iter);
if (converge.iter < 1)
return;
if (iconvsolve) {
converge.iconvvels = 0;
ex = getabsmax3Ddouble (u, 2, L2, 1, M2, 1, N2);
residual.umx = ex.value;
ex = getabsmax3Ddouble (v, 1, L2, 2, M2, 1, N2);
residual.vmx = ex.value;
-11-:**--F1 main.c 15% L66 (C/*l Abbrev)
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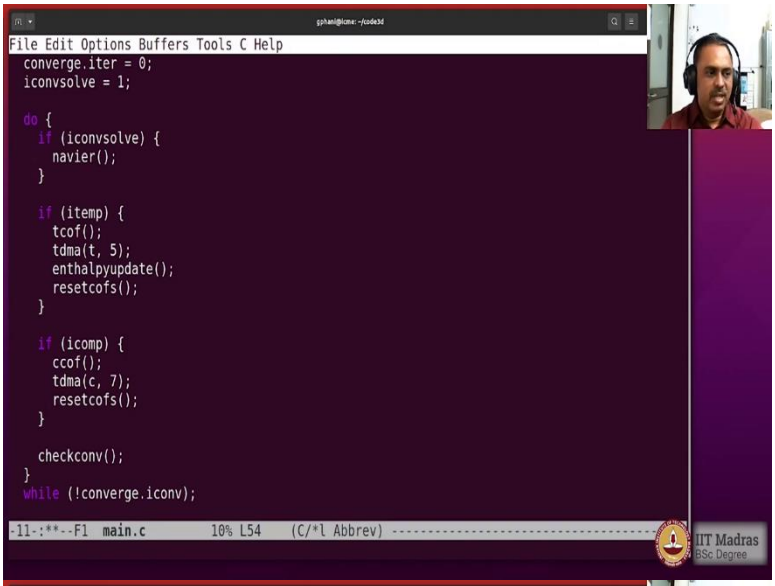
gphani@icme: ~/code3d
File Edit Options Buffers Tools C Help
converge.iter = 0;
iconvsolve = 1;
do {
if (iconvsolve) {
navier();
}
if (itemp) {
tcof();
tdma(t, 5);
enthalpyupdate();
resetcofs();
}
if (icomp) {
ccof();
tdma(c, 7);
resetcofs();
}
checkconv();
}
while (!converge.iconv);
-11-:**--F1 main.c 10% L54 (C/*l Abbrev)
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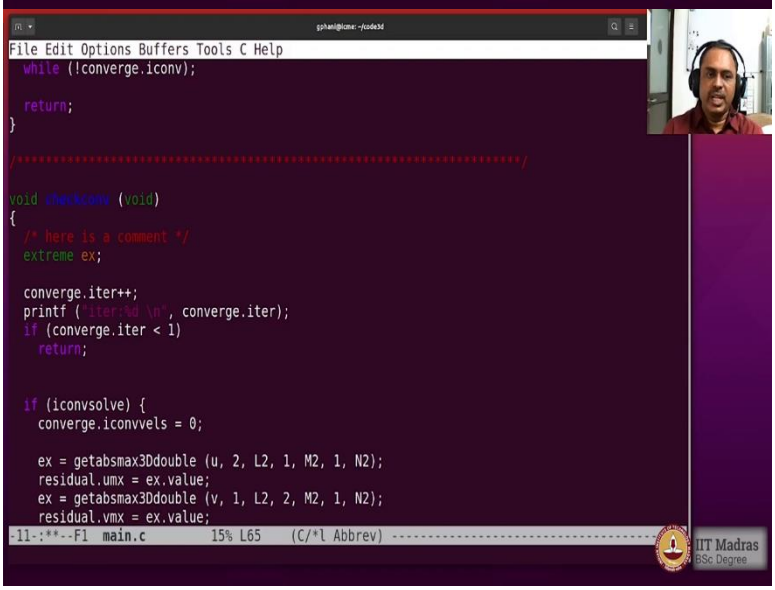
gphani@icme: ~/code3d
File Edit Options Buffers Tools C Help
while (!converge.iconv);
return;
}
/***/
void checkconv (void)
{
/* here is a comment */
extreme ex;
converge.iter++;
printf ("iter:%d \n", converge.iter);
if (converge.iter < 1)
return;
if (iconvsolve) {
converge.iconvvels = 0;
ex = getabsmax3Ddouble (u, 2, L2, 1, M2, 1, N2);
residual.umx = ex.value;
ex = getabsmax3Ddouble (v, 1, L2, 2, M2, 1, N2);
residual.vmx = ex.value;
-11-:**--F1 main.c 15% L65 (C/*l Abbrev)
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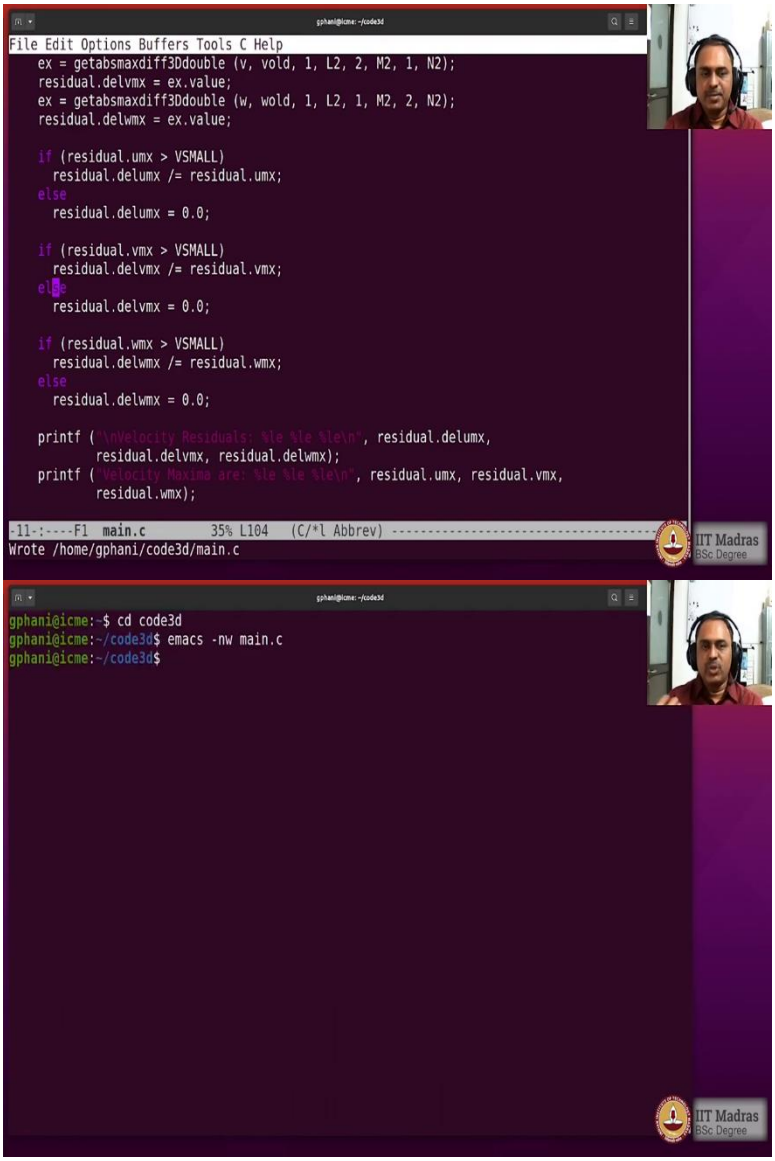

So, when we type emacs, it will usually open a graphical user interface, because we are running it in the GUI mode, but you can actually force it to open only in the terminal by using the minus new option. So, I have the source code so cd code3d, and I will open one of the codes main dot c using the option minus nw.

So, then it is opening within the terminal window itself. Now you can see that you are able to move around using the cursor keys, and you can start typing already because there is only one more you know, so I just go and start typing. So that seems to be quite nice and you can delete the characters using the backspace. You can see that I am able to delete now, and I can also type something here.

And so, you could see that you are able to edit quite comfortably and you can go forward Ctrl down Ctrl Delete Ctrl D to delete the characters. So, when you press Ctrl P, then you are going up one line, when you press Ctrl B, you are moving left one line. Then when you press

meta that is Alt key, then meta B, then you would go left of the previous word, meta F would go right of the next word, then meta A would go to the beginning of the line and meta E would take you to the end of the line meta V would scroll the page by one screen, and the Ctrl V would actually move the page forward by one screen, Ctrl A go to the beginning of the line Ctrl E to the end of the line.

So, meta is for the words. So, I come here and show you here Alt A goes to the beginning of the text, Alt E to the end of the text. But meta, Ctrl A would actually go to the beginning of the line itself but not the text. So, it is also useful for changing the text or go to the beginning of the line to add some character etc. So, the meta and alt meta which is Alt key and the Ctrl character are both used for composing the commands and there are various commands like that.

So, some of the popularly used commands to move around and delete text etc, you may want to have a look. You could always delete the text using the backspace so you do not need to actually have a key for that, and you can add a text just by typing always. So, basic editing is something that you do not have to worry at all, you can right away start editing. Whenever you are done with your editing you can you can save your work by pressing Ctrl X and then Ctrl S so, then it would write the file, and then you want to come out Ctrl X and then Ctrl C, so you come out of the Emacs editor. So, like this you have many features of emacs which we have summarized. So, try it out and see which one you like either emacs or Vi.

Both editors are anyway available in all the Linux variants. So, once you learn to use one of the two editors either Vi or emacs you can stick to it and become expert at it with time.

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The movie The Terminal with Tom Hanks has a sentence on the poster which says life is waiting, so the person wants to get out of the terminal because life is waiting for that person outside, but for us programmers, when we get into the terminal is when the life has started becoming more fun and with more control. So, I hope, you will enjoy your stay inside the terminal and find a lot of things to do there so that you will like to like to stay in the terminal and keep doing your work and understand the Linux operating system to a greater depth.