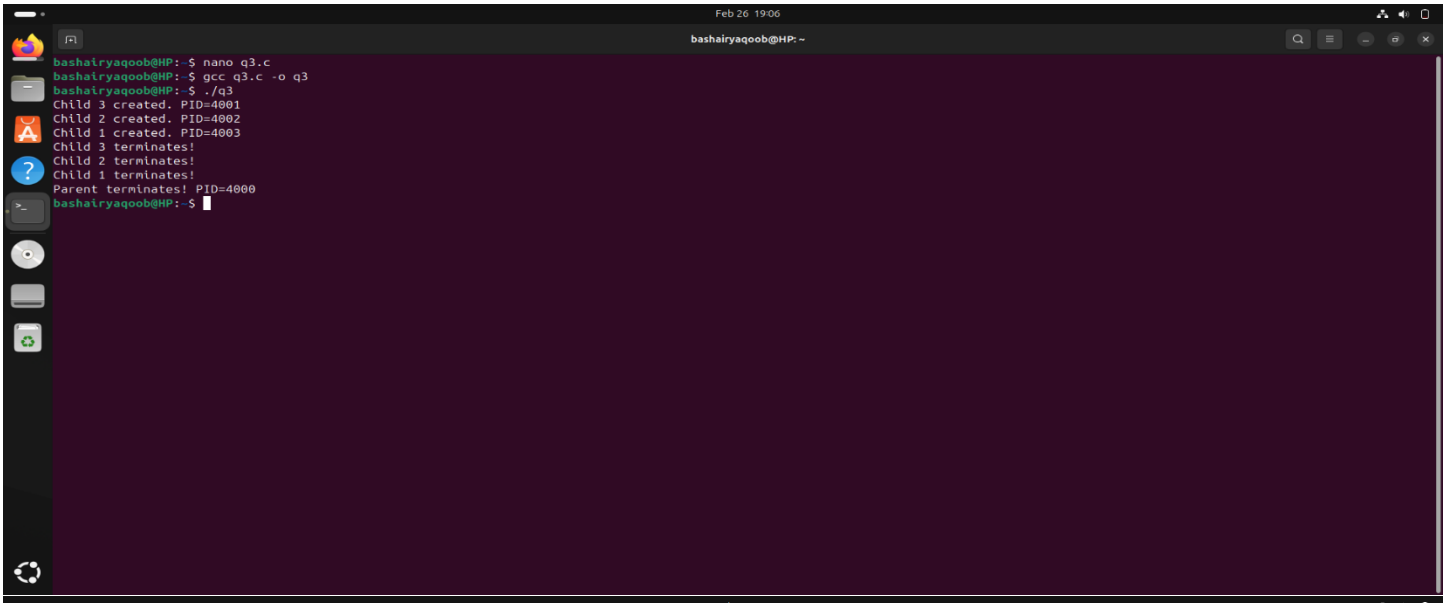
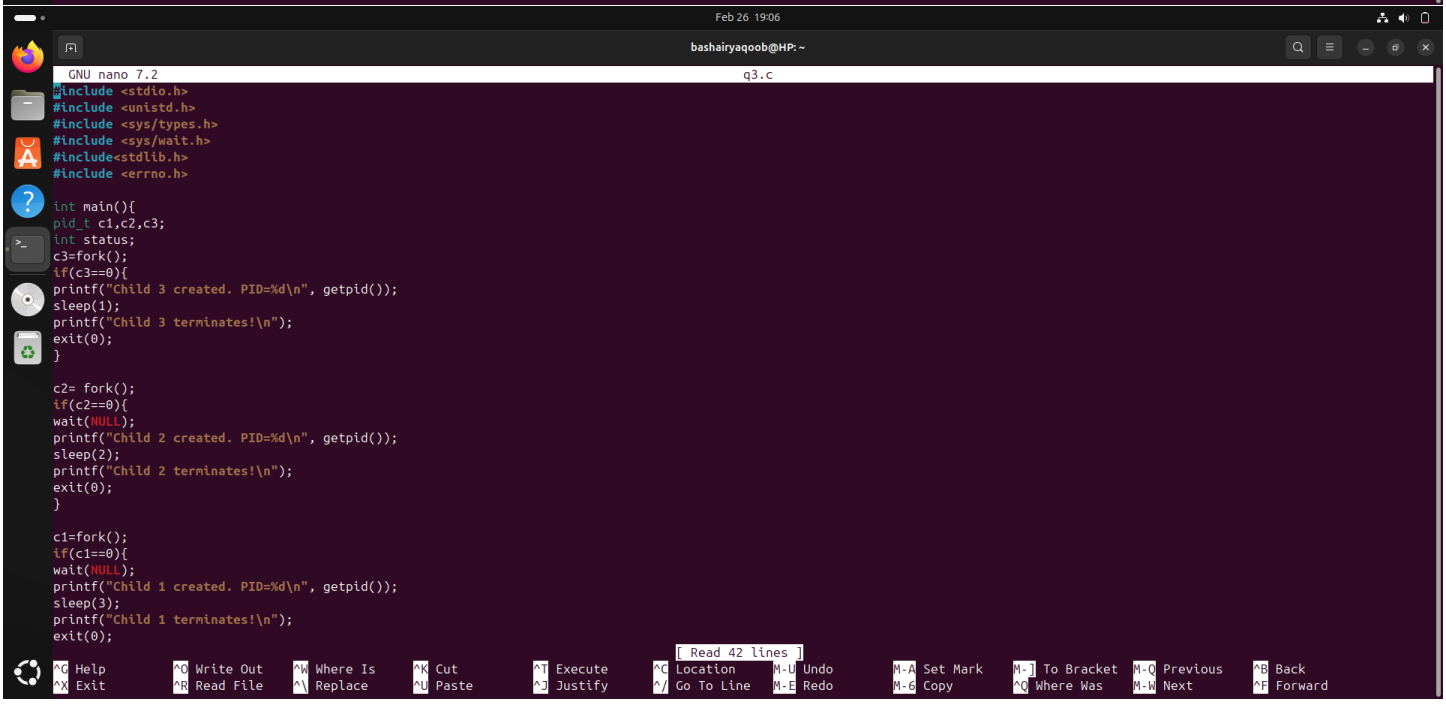
OS LAB 4:

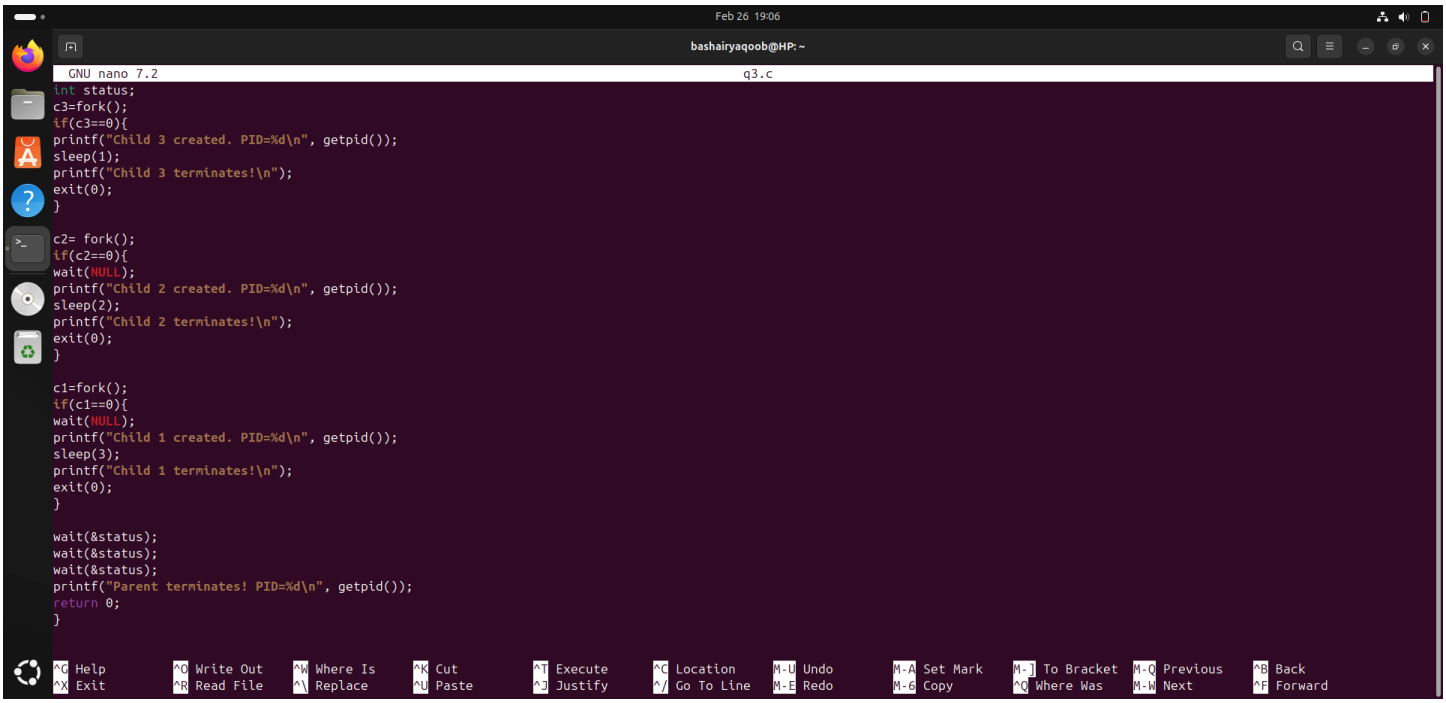
24k-0810

Q3: 3. Write Program to create four processes (1 parent and 3 children) where they terminate in a sequence as follows:

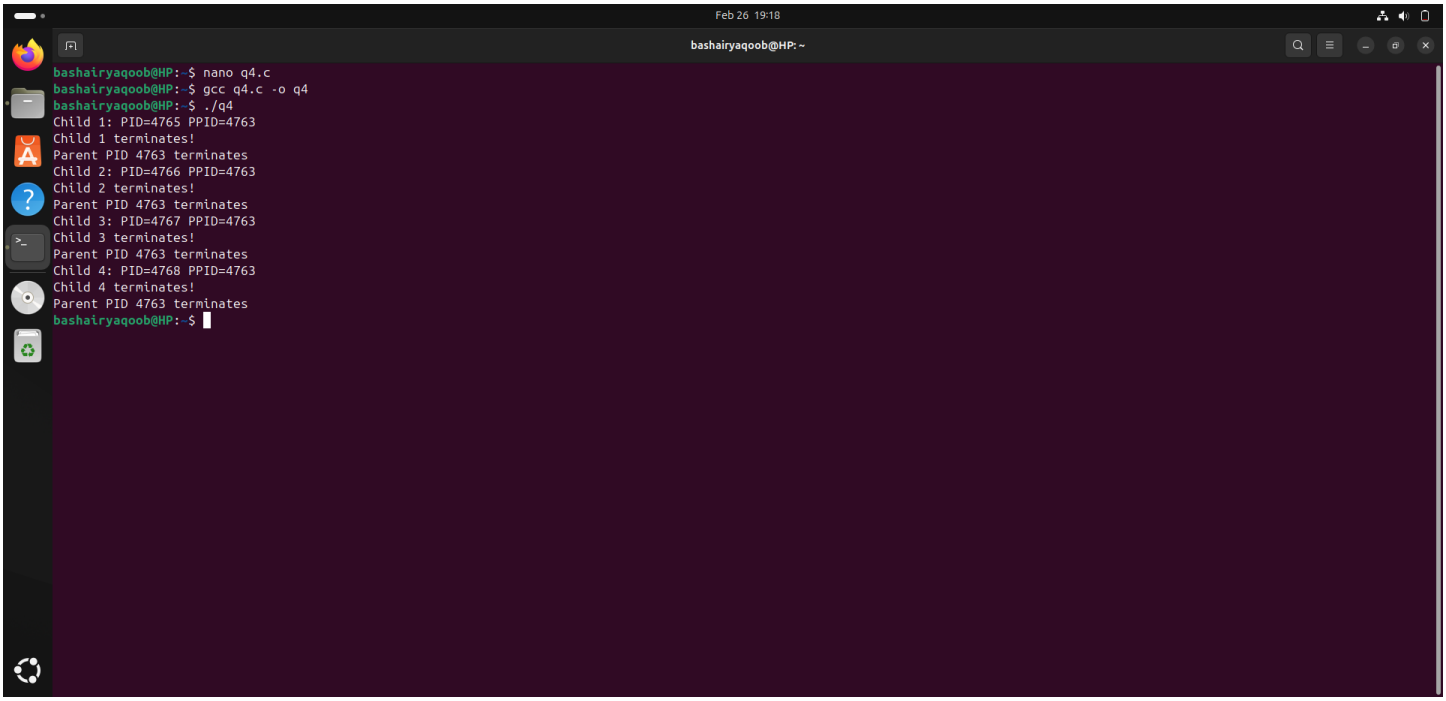
- Parent process terminates at last
- The first child terminates before the parent and after the second child.
- The second child terminates after the last and before the first child.
- The third child terminates first.





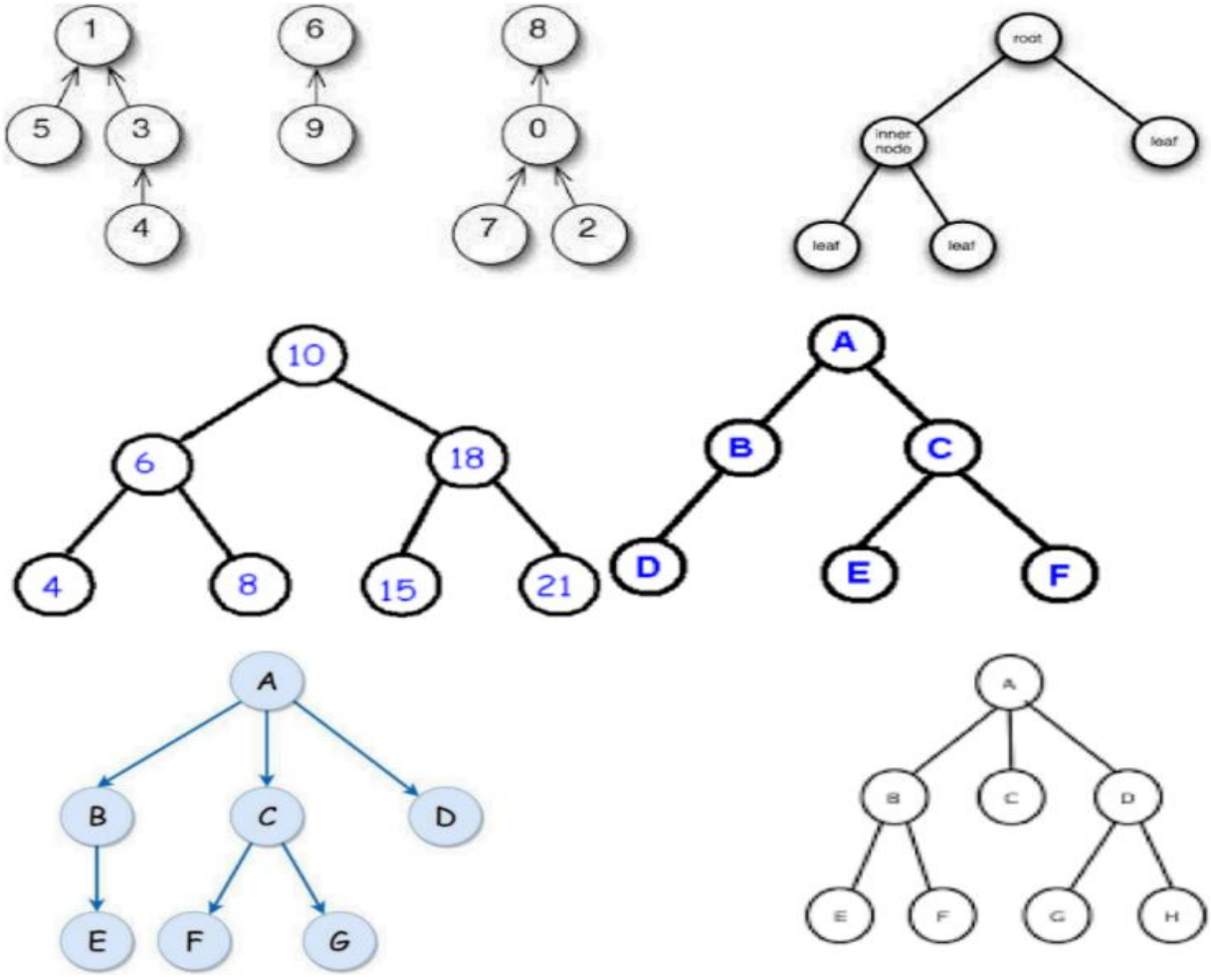


Q4: 4. Write a program which creates 4 processes for parallel programming. Each parent will wait for the termination of their child.

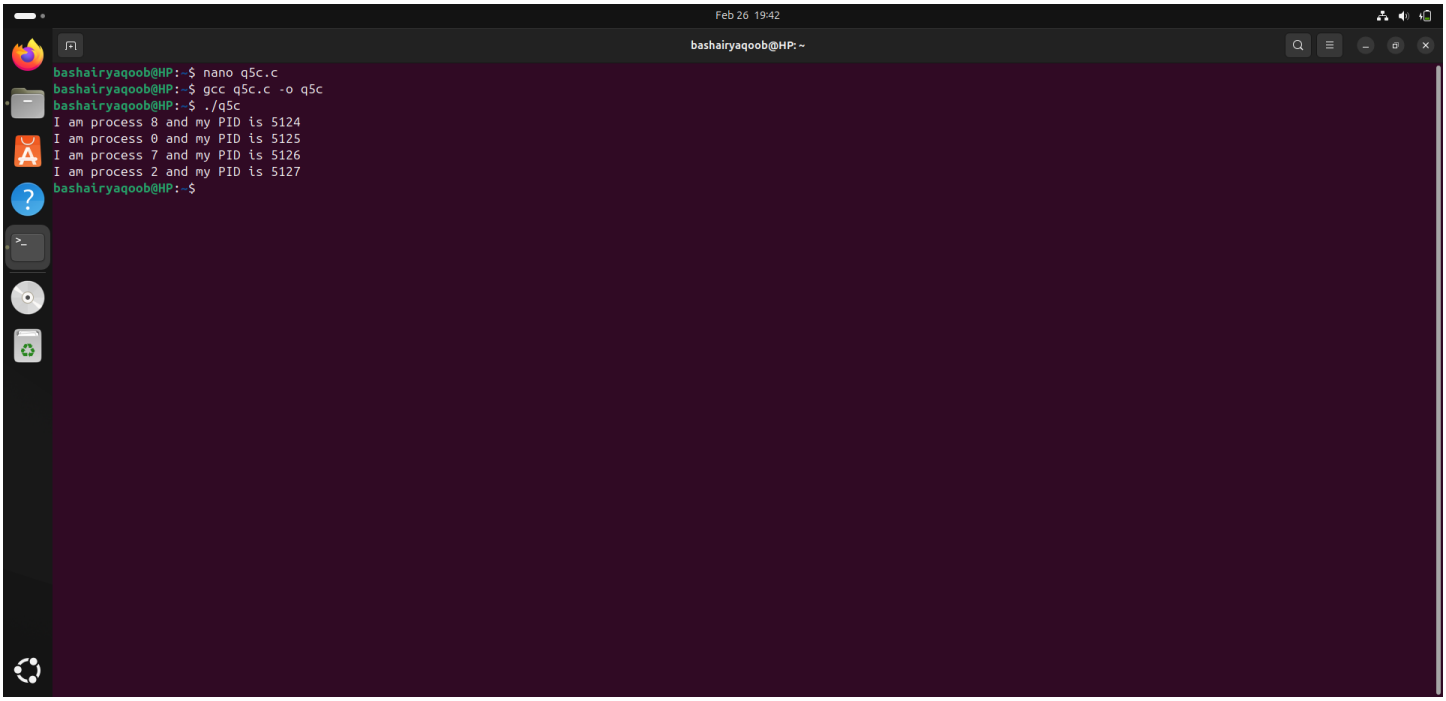


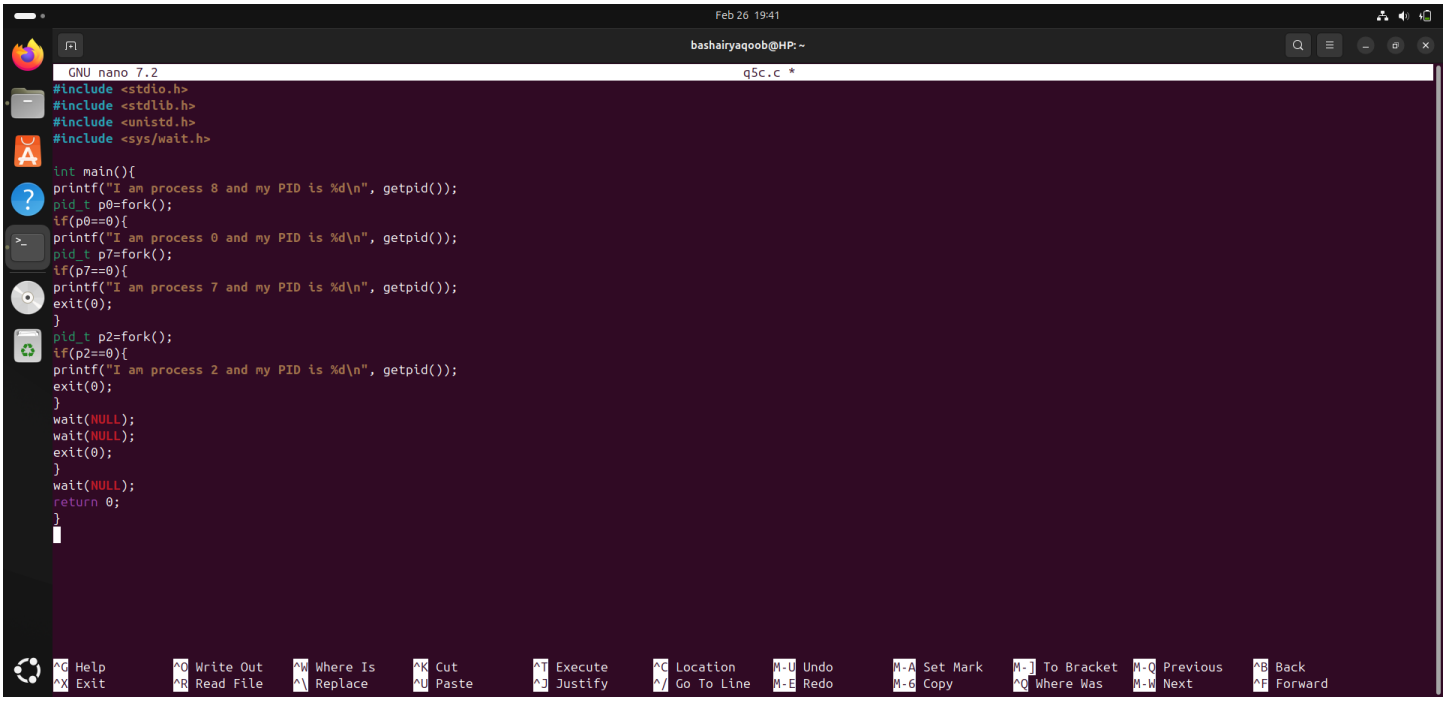
```
Feb 26 19:18
bashairyaqoob@HP: ~
 GNU nano 7.2                                  q4.c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/wait.h>

int main(){
pid_t child;
int i, status;
for(i=0; i<4; i++){
child=fork();

if(child<0){
perror("Fork failed!");
exit(1);
}

if(child==0){
printf("Child %d: PID=%d PPID=%d\n", i+1, getpid(), getppid());
sleep(2);
printf("Child %d terminates!\n", i+1);
exit(0);
}

else{
wait(&status);
printf("Parent PID %d terminates\n", getpid());
}
}
return 0;
}
                              [ Read 30 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut       ^T Execute   ^C Location  M-U Undo    M-A Set Mark  M-] To Bracket  M-Q Previous  ^B Back
^X Exit      ^R Read File  ^\ Replace    ^U Paste     ^J Justify   ^/ Go To Line M-E Redo    M-6 Copy      ^Q Where Was    M-W Next      ^F Forward
```

Q5: Implement the following 6 tree structures. Each node must print its name and PID.

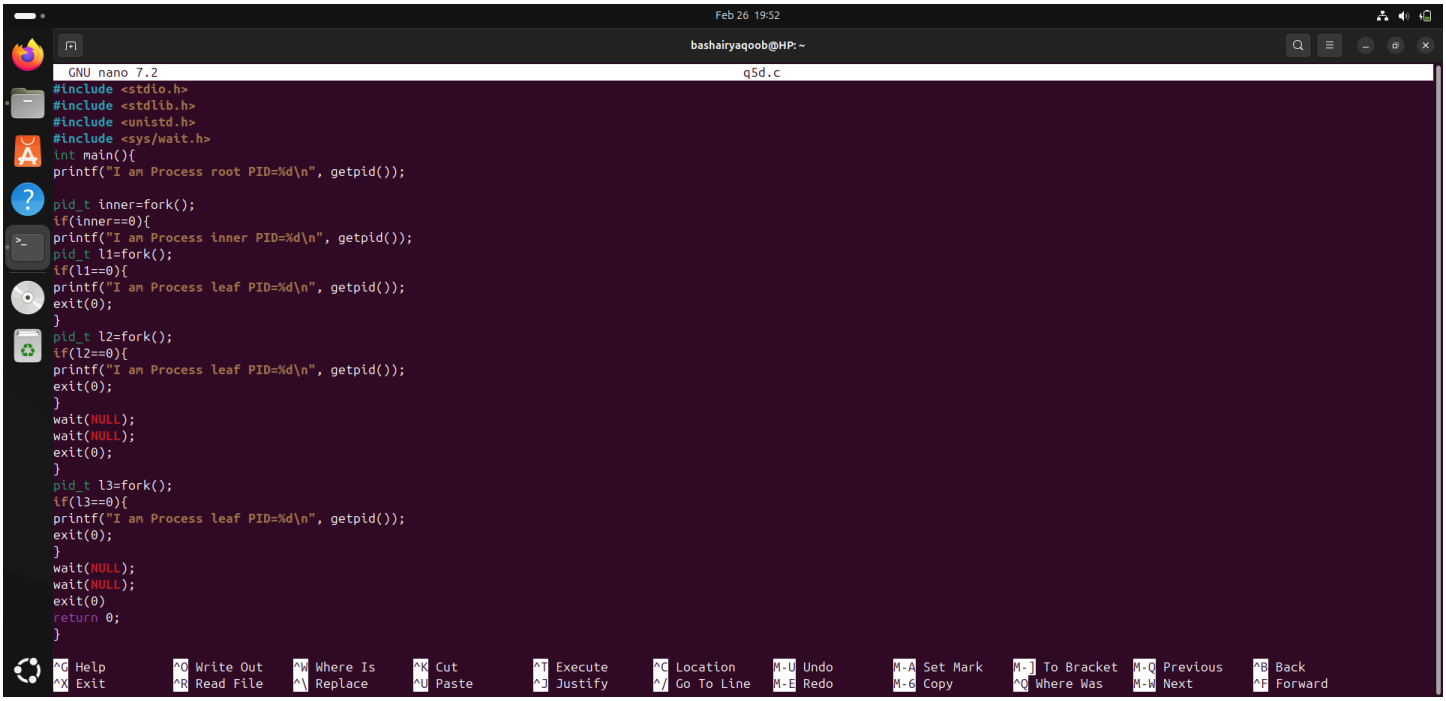


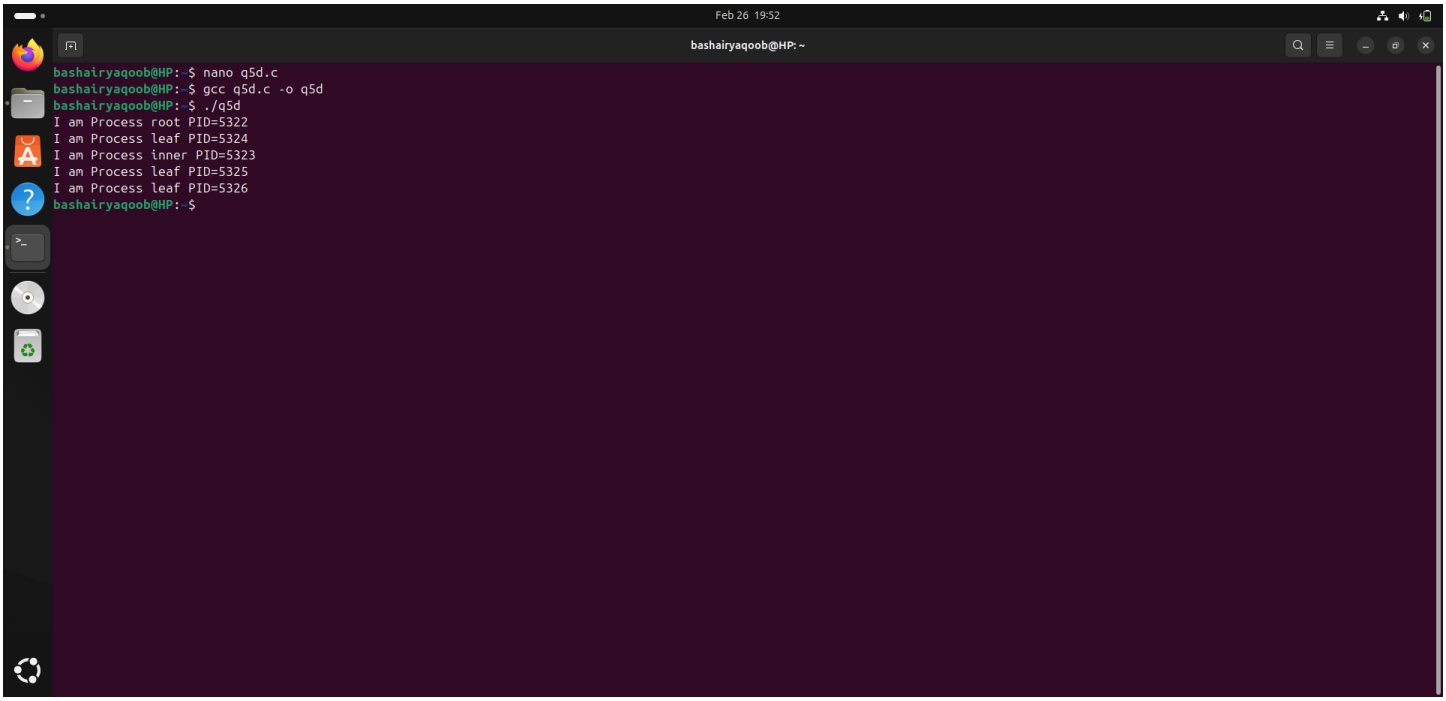
C:


Feb 26 19:42
bashairyaqoob@HP: ~
bashairyaqoob@HP:~$ nano q5c.c
bashairyaqoob@HP:~$ gcc q5c.c -o q5c
bashairyaqoob@HP:~$ ./q5c
I am process 8 and my PID is 5124
I am process 0 and my PID is 5125
I am process 7 and my PID is 5126
I am process 2 and my PID is 5127
bashairyaqoob@HP:~$

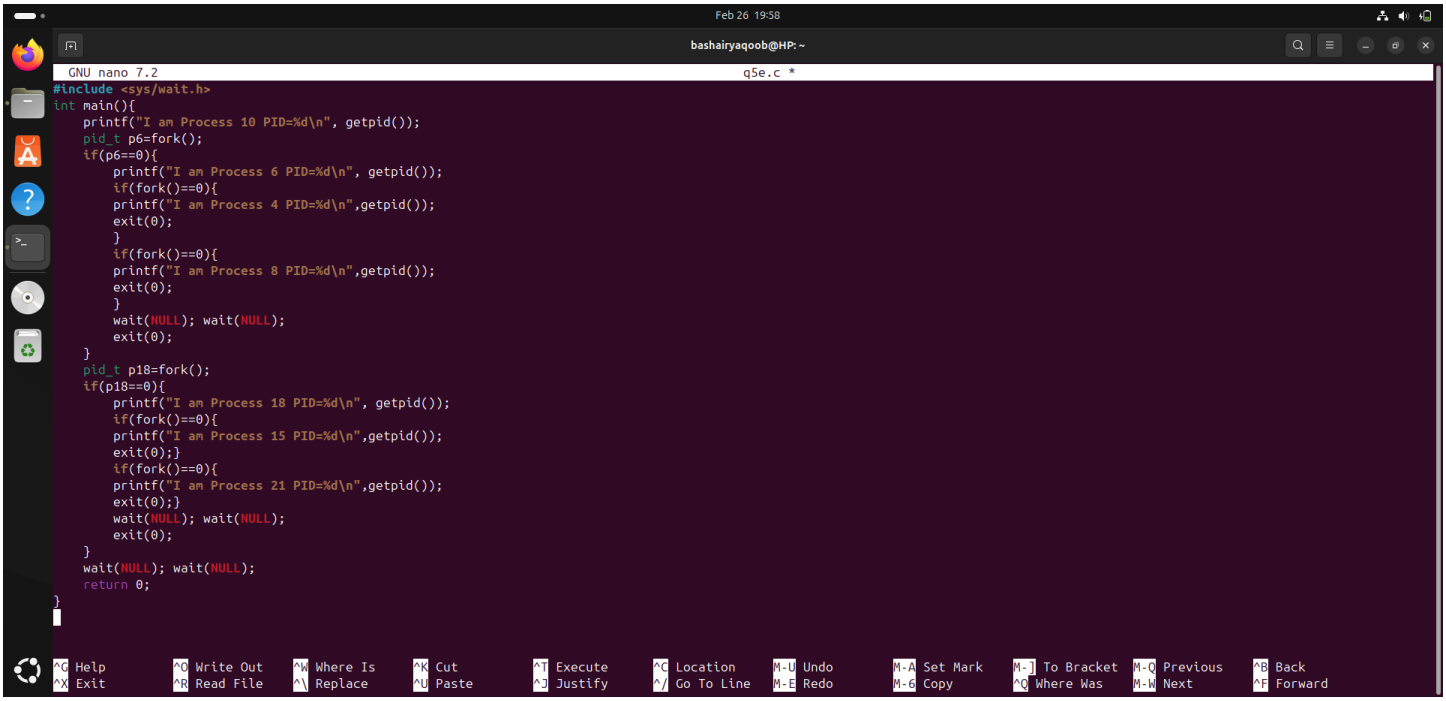

Feb 26 19:41
bashairyaqoob@HP: ~
GNU nano 7.2 q5c.c *
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/wait.h>
int main(){
printf("I am process 8 and my PID is %d\n", getpid());
pid_t p0=fork();
if(p0==0){
printf("I am process 0 and my PID is %d\n", getpid());
pid_t p7=fork();
if(p7==0){
printf("I am process 7 and my PID is %d\n", getpid());
exit(0);
}
pid_t p2=fork();
if(p2==0){
printf("I am process 2 and my PID is %d\n", getpid());
exit(0);
}
wait(NULL);
wait(NULL);
exit(0);
}
wait(NULL);
return 0;
}
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo M-A Set Mark M-] To Bracket M-Q Previous ^B Back
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy ^Q Where Was M-W Next ^F Forward

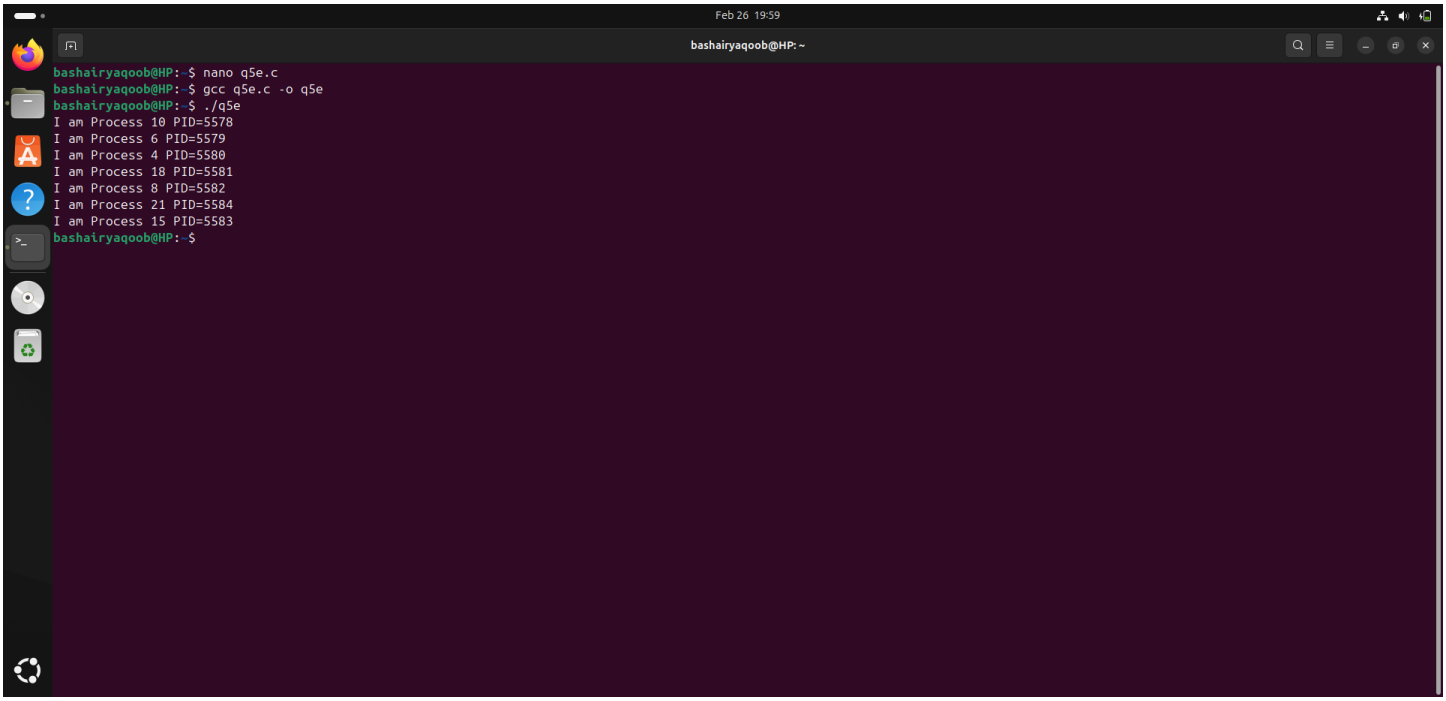
(D):


Feb 26 19:52
bashairyaqoob@HP: ~
GNU nano 7.2
q5d.c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/wait.h>
int main(){
printf("I am Process root PID=%d\n", getpid());
pid_t inner=fork();
if(inner==0){
printf("I am Process inner PID=%d\n", getpid());
pid_t l1=fork();
if(l1==0){
printf("I am Process leaf PID=%d\n", getpid());
exit(0);
}
pid_t l2=fork();
if(l2==0){
printf("I am Process leaf PID=%d\n", getpid());
exit(0);
}
wait(NULL);
wait(NULL);
exit(0);
}
pid_t l3=fork();
if(l3==0){
printf("I am Process leaf PID=%d\n", getpid());
exit(0);
}
wait(NULL);
wait(NULL);
exit(0)
return 0;
}
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo M-A Set Mark M-] To Bracket M-Q Previous ^B Back
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy ^Q Where Was M-W Next ^F Forward

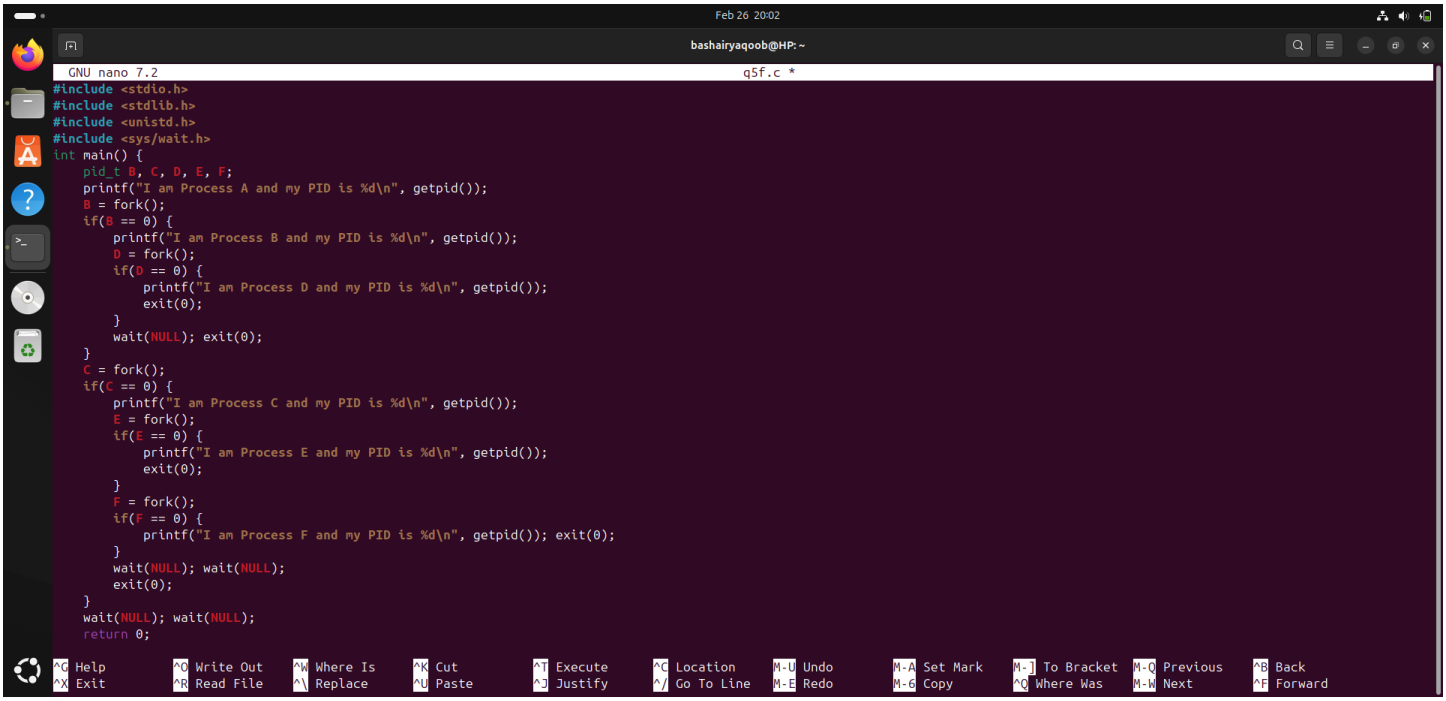

Feb 26 19:52
bashairyaqoob@HP: ~
bashairyaqoob@HP:~$ nano q5d.c
bashairyaqoob@HP:~$ gcc q5d.c -o q5d
bashairyaqoob@HP:~$ ./q5d
I am Process root PID=5322
I am Process leaf PID=5324
I am Process inner PID=5323
I am Process leaf PID=5325
I am Process leaf PID=5326
bashairyaqoob@HP:~$

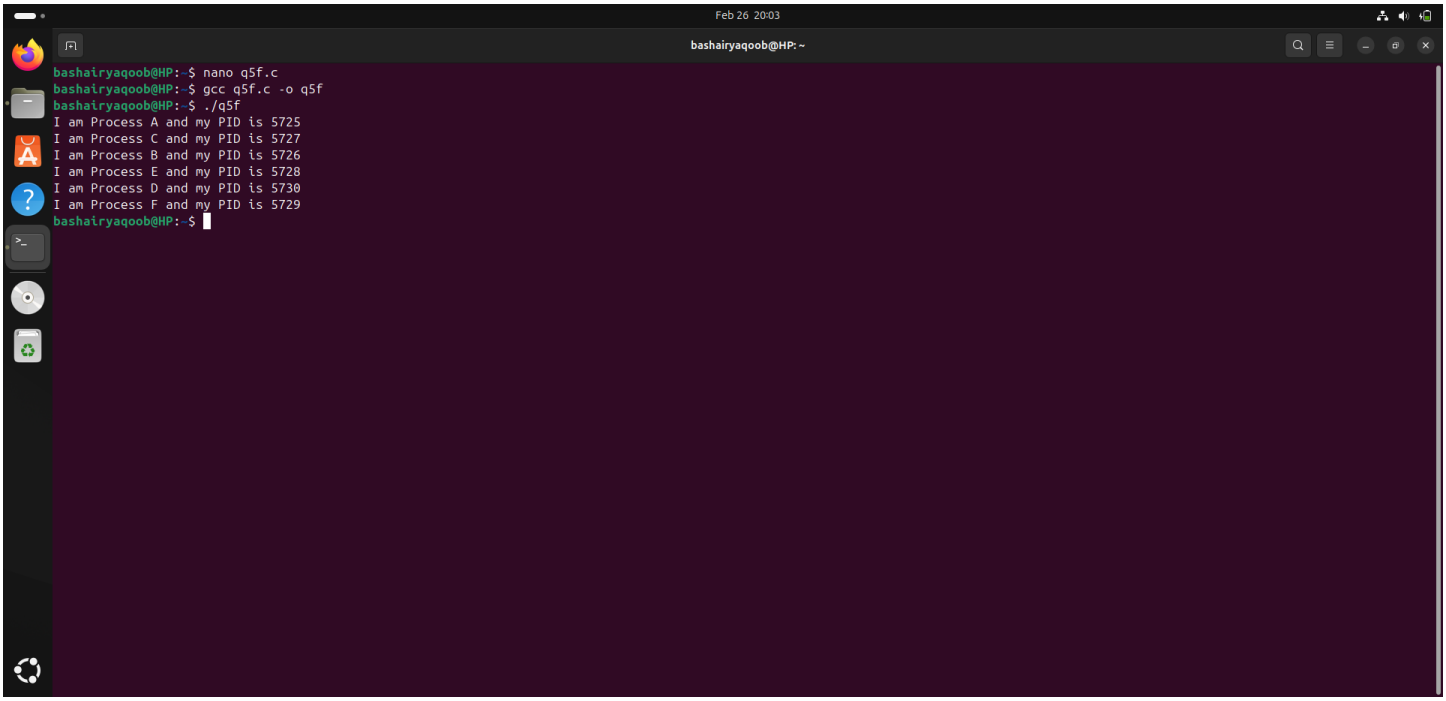
(E):


Feb 26 19:58
bashairyaqoob@HP: ~
GNU nano 7.2
q5e.c *
#include <sys/wait.h>
int main(){
printf("I am Process 10 PID=%d\n", getpid());
pid_t p6=fork();
if(p6==0){
printf("I am Process 6 PID=%d\n", getpid());
if(fork()==0){
printf("I am Process 4 PID=%d\n",getpid());
exit(0);
}
if(fork()==0){
printf("I am Process 8 PID=%d\n",getpid());
exit(0);
}
wait(NULL); wait(NULL);
exit(0);
}
pid_t p18=fork();
if(p18==0){
printf("I am Process 18 PID=%d\n", getpid());
if(fork()==0){
printf("I am Process 15 PID=%d\n",getpid());
exit(0);}
if(fork()==0){
printf("I am Process 21 PID=%d\n",getpid());
exit(0);}
wait(NULL); wait(NULL);
exit(0);
}
wait(NULL); wait(NULL);
return 0;
}
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo M-A Set Mark M-] To Bracket M-Q Previous ^B Back
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy ^Q Where Was M-W Next ^F Forward

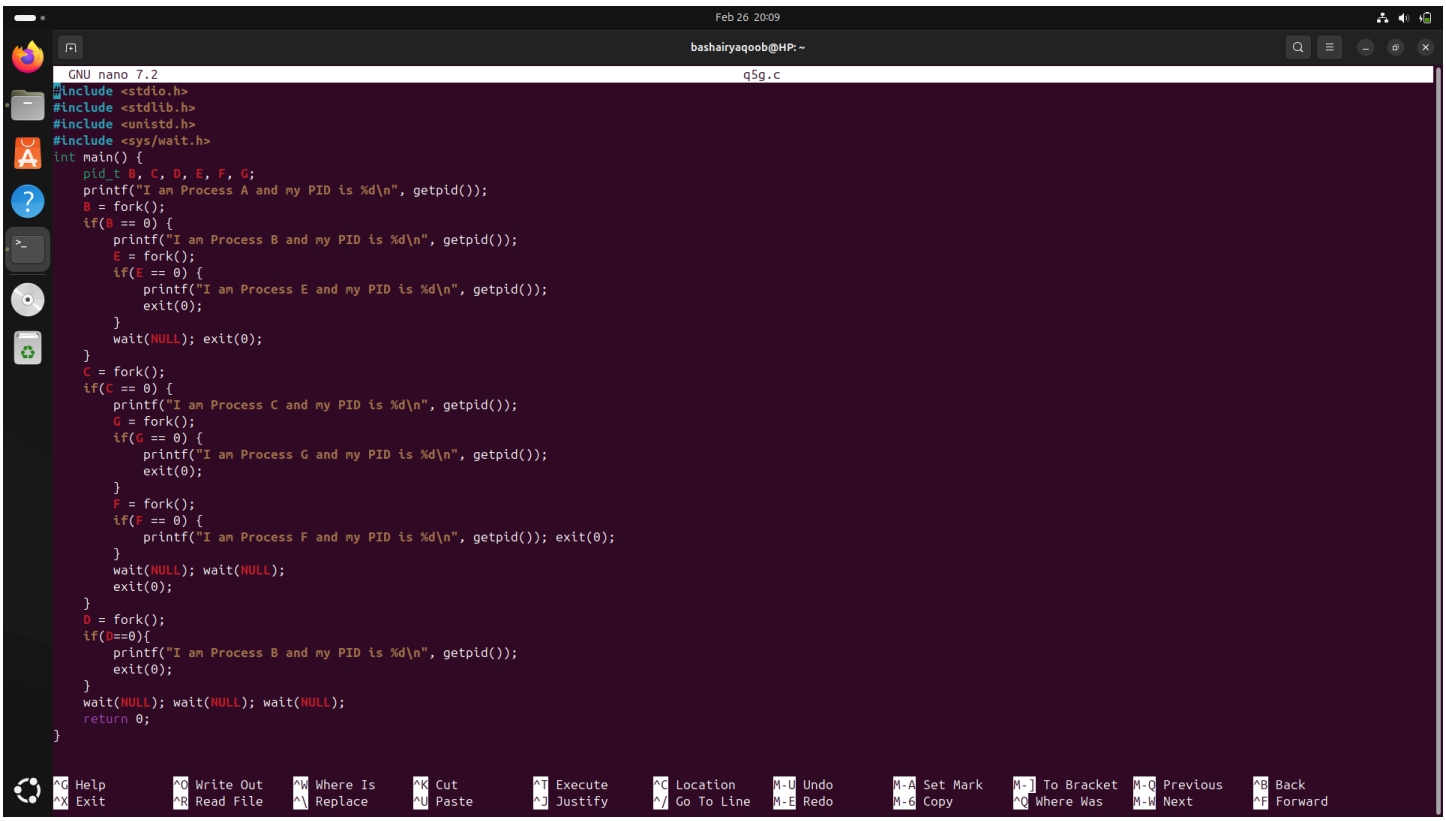

Feb 26 19:59
bashairyaqoob@HP: ~
bashairyaqoob@HP:~$ nano q5e.c
bashairyaqoob@HP:~$ gcc q5e.c -o q5e
bashairyaqoob@HP:~$ ./q5e
I am Process 10 PID=5578
I am Process 6 PID=5579
I am Process 4 PID=5580
I am Process 18 PID=5581
I am Process 8 PID=5582
I am Process 21 PID=5584
I am Process 15 PID=5583
bashairyaqoob@HP:~$

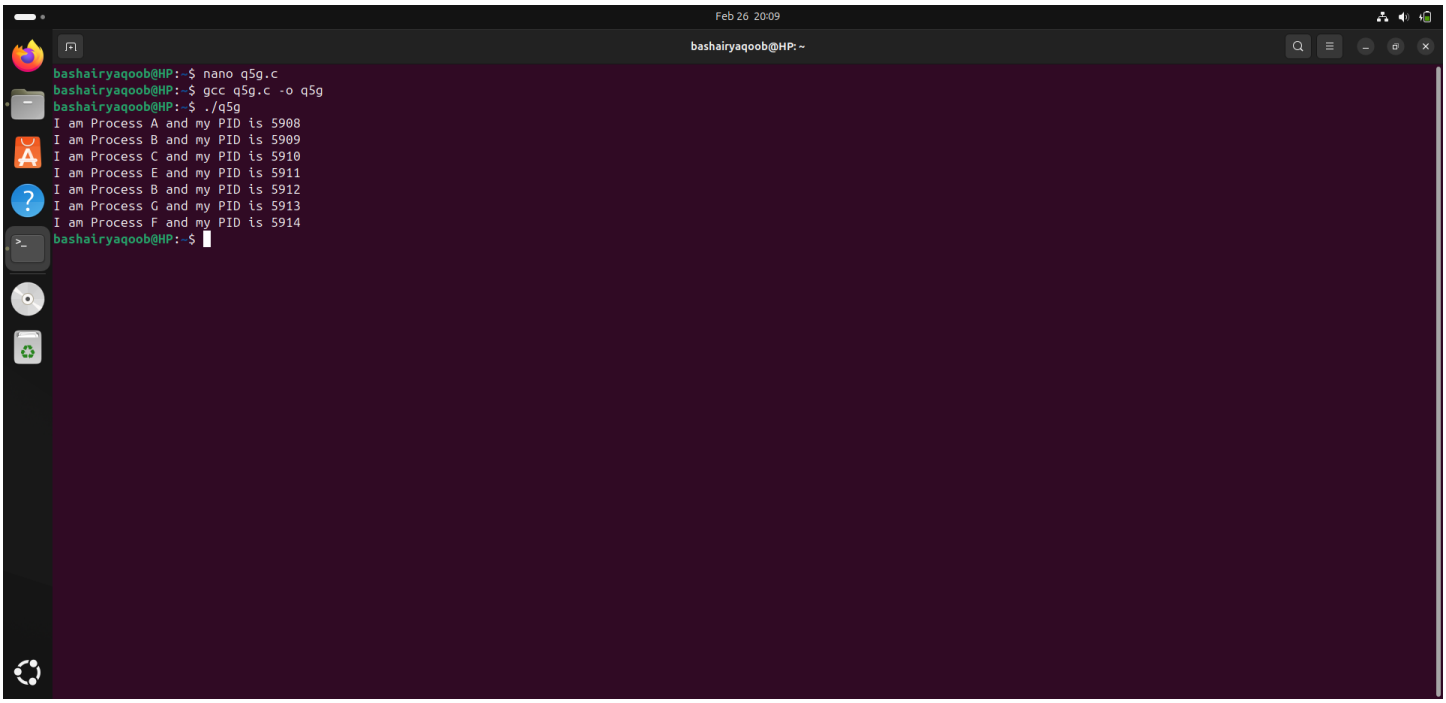
(F):


Feb 26 20:02
bashairyaqoob@HP: ~
GNU nano 7.2
q5f.c *
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/wait.h>
int main() {
pid_t B, C, D, E, F;
printf("I am Process A and my PID is %d\n", getpid());
B = fork();
if(B == 0) {
printf("I am Process B and my PID is %d\n", getpid());
D = fork();
if(D == 0) {
printf("I am Process D and my PID is %d\n", getpid());
exit(0);
}
wait(NULL); exit(0);
}
C = fork();
if(C == 0) {
printf("I am Process C and my PID is %d\n", getpid());
E = fork();
if(E == 0) {
printf("I am Process E and my PID is %d\n", getpid());
exit(0);
}
F = fork();
if(F == 0) {
printf("I am Process F and my PID is %d\n", getpid()); exit(0);
}
wait(NULL); wait(NULL);
exit(0);
}
wait(NULL); wait(NULL);
return 0;
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo M-A Set Mark M-] To Bracket M-Q Previous ^B Back
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy ^Q Where Was M-W Next ^F Forward

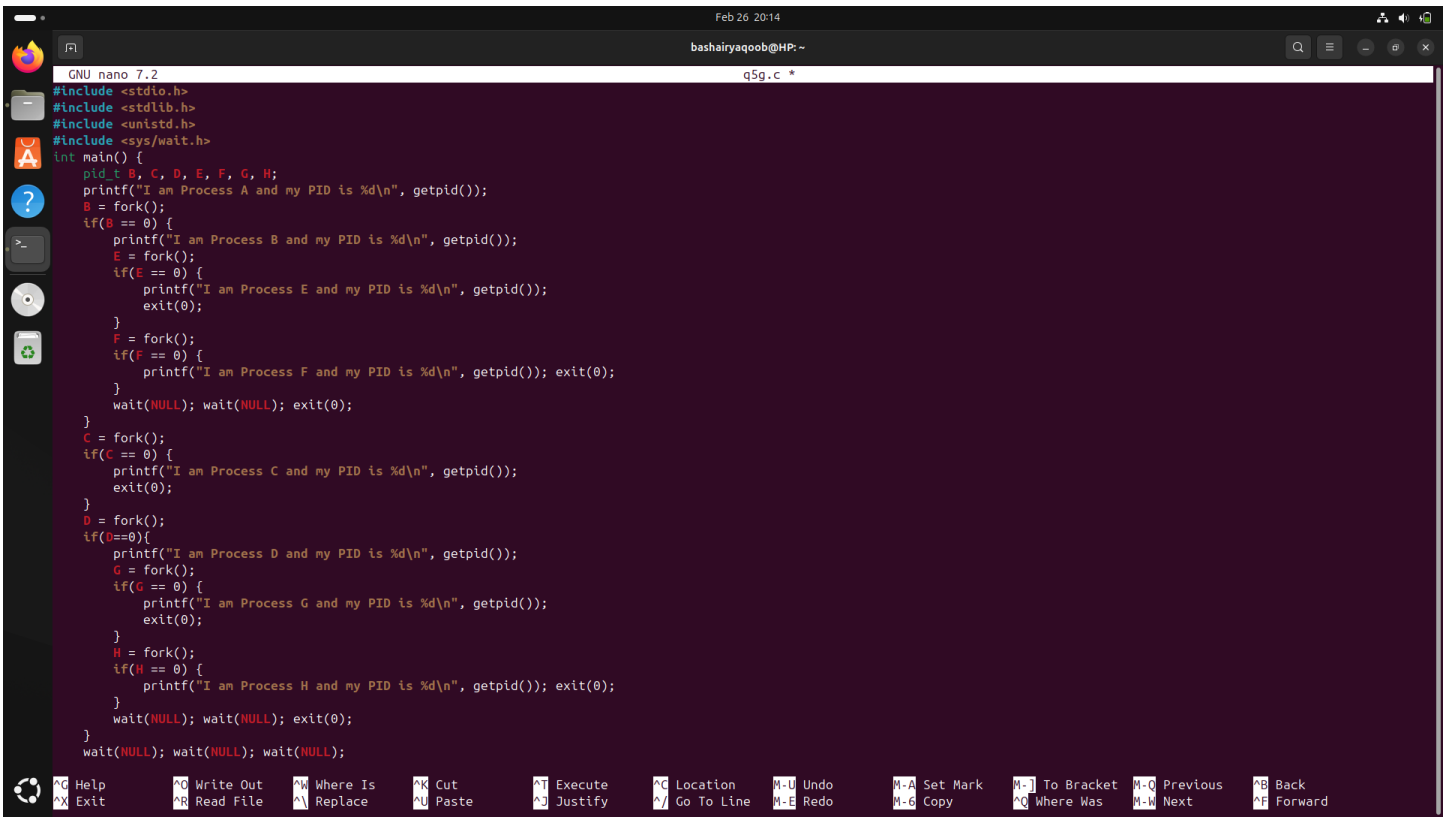

Feb 26 20:03
bashairyaqoob@HP: ~
bashairyaqoob@HP:~$ nano q5f.c
bashairyaqoob@HP:~$ gcc q5f.c -o q5f
bashairyaqoob@HP:~$ ./q5f
I am Process A and my PID is 5725
I am Process C and my PID is 5727
I am Process B and my PID is 5726
I am Process E and my PID is 5728
I am Process D and my PID is 5730
I am Process F and my PID is 5729
bashairyaqoob@HP:~$

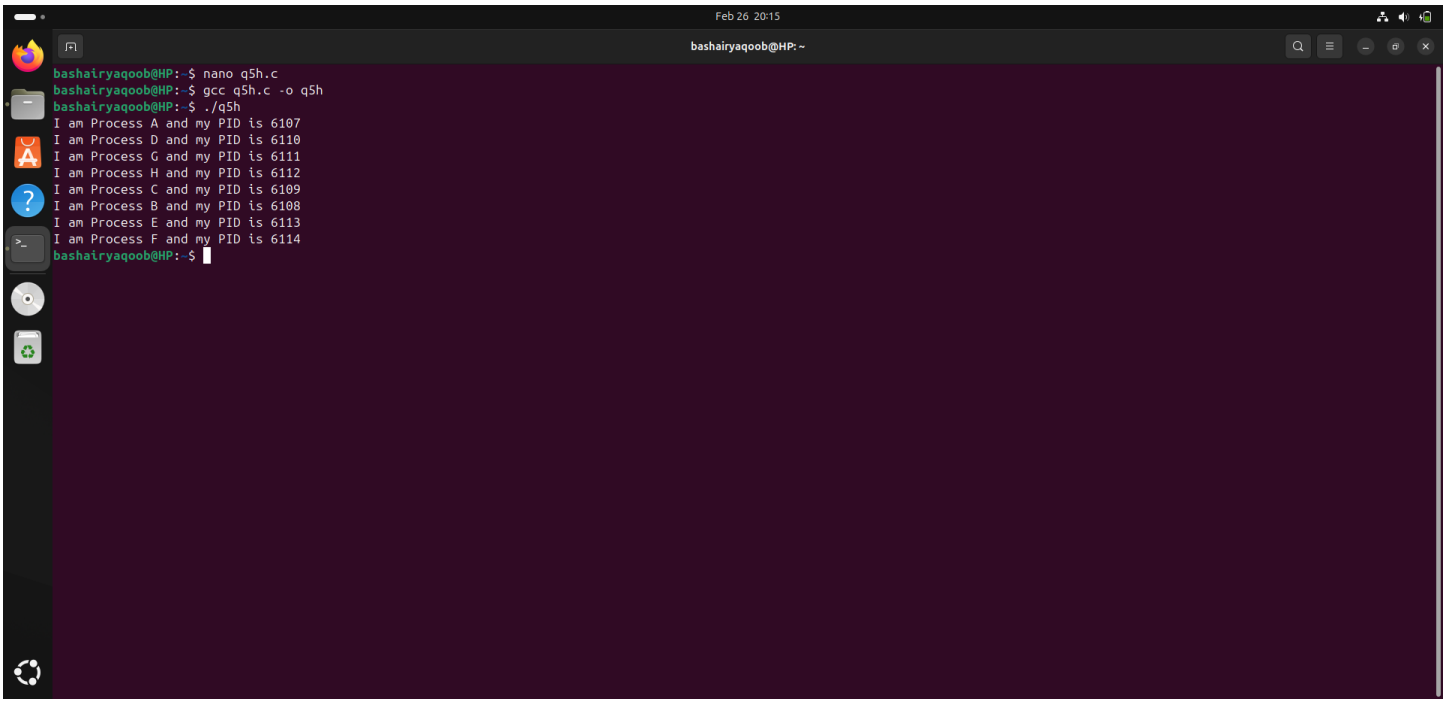
(G):


Feb 26 20:09
bashairyaqoob@HP: ~
GNU nano 7.2
q5g.c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/wait.h>
int main() {
pid_t B, C, D, E, F, G;
printf("I am Process A and my PID is %d\n", getpid());
B = fork();
if(B == 0) {
printf("I am Process B and my PID is %d\n", getpid());
E = fork();
if(E == 0) {
printf("I am Process E and my PID is %d\n", getpid());
exit(0);
}
wait(NULL); exit(0);
}
C = fork();
if(C == 0) {
printf("I am Process C and my PID is %d\n", getpid());
G = fork();
if(G == 0) {
printf("I am Process G and my PID is %d\n", getpid());
exit(0);
}
F = fork();
if(F == 0) {
printf("I am Process F and my PID is %d\n", getpid()); exit(0);
}
wait(NULL); wait(NULL);
exit(0);
}
D = fork();
if(D==0){
printf("I am Process B and my PID is %d\n", getpid());
exit(0);
}
wait(NULL); wait(NULL); wait(NULL);
return 0;
}
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo M-A Set Mark M-] To Bracket M-Q Previous ^B Back
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-6 Copy ^Q Where Was M-W Next ^F Forward


Feb 26 20:09
bashairyaqoob@HP: ~
bashairyaqoob@HP:~$ nano q5g.c
bashairyaqoob@HP:~$ gcc q5g.c -o q5g
bashairyaqoob@HP:~$ ./q5g
I am Process A and my PID is 5908
I am Process B and my PID is 5909
I am Process C and my PID is 5910
I am Process E and my PID is 5911
I am Process B and my PID is 5912
I am Process G and my PID is 5913
I am Process F and my PID is 5914
bashairyaqoob@HP:~$

(H):


Feb 26 20:14
bashairyaqoob@HP: ~
GNU nano 7.2
q5g.c *
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/wait.h>
int main() {
pid_t B, C, D, E, F, G, H;
printf("I am Process A and my PID is %d\n", getpid());
B = fork();
if(B == 0) {
printf("I am Process B and my PID is %d\n", getpid());
E = fork();
if(E == 0) {
printf("I am Process E and my PID is %d\n", getpid());
exit(0);
}
F = fork();
if(F == 0) {
printf("I am Process F and my PID is %d\n", getpid()); exit(0);
}
wait(NULL); wait(NULL); exit(0);
}
C = fork();
if(C == 0) {
printf("I am Process C and my PID is %d\n", getpid());
exit(0);
}
D = fork();
if(D==0){
printf("I am Process D and my PID is %d\n", getpid());
G = fork();
if(G == 0) {
printf("I am Process G and my PID is %d\n", getpid());
exit(0);
}
H = fork();
if(H == 0) {
printf("I am Process H and my PID is %d\n", getpid()); exit(0);
}
wait(NULL); wait(NULL); exit(0);
}
wait(NULL); wait(NULL); wait(NULL);
^G Help
^X Exit
^O Write Out
^R Read File
^W Where Is
^\ Replace
^K Cut
^U Paste
^T Execute
^J Justify
^C Location
^/ Go To Line
M-U Undo
M-E Redo
M-A Set Mark
M-6 Copy
M-] To Bracket
^Q Where Was
M-Q Previous
M-W Next
^B Back
^F Forward


Feb 26 20:15
bashairyaqoob@HP: ~
bashairyaqoob@HP:~$ nano q5h.c
bashairyaqoob@HP:~$ gcc q5h.c -o q5h
bashairyaqoob@HP:~$ ./q5h
I am Process A and my PID is 6107
I am Process D and my PID is 6110
I am Process G and my PID is 6111
I am Process H and my PID is 6112
I am Process C and my PID is 6109
I am Process B and my PID is 6108
I am Process E and my PID is 6113
I am Process F and my PID is 6114
bashairyaqoob@HP:~$