

Task No 1

```
#include<stdio.h>
#include<sys/types.h>
#include<stdlib.h>
#include<sys/wait.h>
#include<unistd.h>
int main()
{
    int process_ID = fork();
    if (process_ID==0)
    {
        printf("Parent ID = %d \n",getppid());
        int i;
        for (i=0; i<=10;i++)
        {
            if(i%2!=0)
            {
                printf("%d \n",i);
            }
        }
        printf("Child Process ends.\n");
    }
    else if(process_ID < 0)
    {
        printf("Creation Failed.\n");
        exit(0);
    }
    else
    {
        int i;
        wait(NULL);
        for(i=1; i<=10;i++)
        {
            if(i%2==0)
            {
                printf("%d \n",i);
            }
        }
        printf("Parent Ends.\n");
    }
}
```

```
return 0;}
```

```
ammansoomro@Amman-PC:~/Visual_Studio$ cd "Lab 4"
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task1
Parent ID = 7180
1
3
5
7
9
Child Process ends.
2
4
6
8
10
Parent Ends.
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$
```

Task No 2

```
#include<stdio.h>
#include<sys/types.h>
#include<stdlib.h>
#include<sys/wait.h>
#include<unistd.h>
int main()
{
    int x;
    printf("Enter a Number: \n");
    scanf("%d",&x);
    for(int i=0; i<x;i++)
    {
        if(fork()==0)
        {
            printf("Child ID: %d ----- Parent ID: %d\n",
getpid(),getppid());
            exit(0);
        }
    }
    for(int i=0; i<x; i++)
    {
        wait(NULL);
    }
    return 0;
}
```

```
}
```

```
ammansoomro@Amman-PC:~/Visual_Studio$ cd "Lab 4"
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task2
Enter a Number:
5
Child ID: 7506 ----- Parent ID: 7504
Child ID: 7507 ----- Parent ID: 7504
Child ID: 7509 ----- Parent ID: 7504
Child ID: 7510 ----- Parent ID: 7504
Child ID: 7508 ----- Parent ID: 7504
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$
```

Task No 3

```
#include<stdio.h>
#include<sys/types.h>
#include<stdlib.h>
#include<sys/wait.h>
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
int main()
{
    int Child_1, Child_2, Child_3;
    Child_1 = fork();
    if (Child_1 == 0) {
        sleep(3);
        printf("Child No.1 ID = %d\nParent ID = %d\n\n", getpid(),
getppid());
    }
    else {
        Child_2 = fork();
        if (Child_2 == 0) {
            sleep(2);
            printf("Child No.2 ID = %d\nParent ID = %d\n\n", getpid(),
getppid());
        }
        else {
            Child_3 = fork();
            if (Child_3 == 0) {
                printf("Child No.3 ID = %d\nParent ID = %d\n\n",
getpid(), getppid());
            }
        }
    }
}
```

```

        else {
            sleep(5);
            printf("Parent ID = %d\n", getpid());
        }
    }
}
return 0;
}

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task3
Child No.3 ID = 7697
Parent ID = 7694

Child No.2 ID = 7696
Parent ID = 7694

Child No.1 ID = 7695
Parent ID = 7694

Parent ID = 7694
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ █

```

Task No 4

```

#include<stdio.h>
#include<sys/types.h>
#include<stdlib.h>
#include<sys/wait.h>
#include<unistd.h>
int main()
{
    printf("Parent Created.....\n\n");
    int Child_1 = fork();
    if(Child_1 == 0)
    {
        printf("-----\n");
        printf("| Child 1 ID: %d | Parent ID: %d\n",getpid(),getppid());
        int Child_2 = fork();
        if (Child_2==0)
        {
            printf("-----\n");
            printf("| Child 2 ID: %d | Parent ID: %d\n",getpid(),getppid());

```

```

        int Child_3 = fork();
        if(Child_3 == 0)
        {
            printf("-----\n");
            printf("| Child 3 ID: %d | Parent ID: %d\n",getpid(),getppid());
            printf("-----\n\n");
            printf("Child 3 Exiting... \n");
        }
        else
        {
            wait(NULL);

            printf("Child 2 Exiting... \n");
        }
    }
    else
    {
        wait(NULL);
        printf("Child 1 Exiting... \n");
    }
}

}
else
{
    wait(NULL);
    printf("Parent exiting... \n");
}
}
}

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task4
Parent Created.....

```

```

-----
| Child 1 ID: 65917 | Parent ID: 65916 |
-----
| Child 2 ID: 65918 | Parent ID: 65917 |
-----
| Child 3 ID: 65919 | Parent ID: 65918 |
-----

```

```

Child 3 Exiting...
Child 2 Exiting...
Child 1 Exiting...
Parent exiting...

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$

```

Task No 5 (A)

```
#include<stdio.h>
#include<sys/types.h>
#include<stdlib.h>
#include<sys/wait.h>
#include<unistd.h>
void Print(char* VALUE) {
    printf("I am process %s with PID %d\n", VALUE, getpid());
}
int main()
{
    Print("1");
    if (!fork()) {
        Print("5");
        exit(0);
    } else {
        if (!fork()) {
            Print("3");
            if (!fork()) {
                Print("4");
                exit(0);
            } else {
                wait(NULL);
            }
            exit(0);
        } else {
            wait(NULL);
        }
        wait(NULL);
    }
}
```

```
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task5a
I am process 1 with PID 21863
I am process 5 with PID 21864
I am process 3 with PID 21865
I am process 4 with PID 21866
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$
```

Task No 5 (B)

```
#include<stdio.h>
#include<sys/types.h>
```

```

#include<stdlib.h>
#include<sys/wait.h>
#include<unistd.h>
void Print(char* VALUE) {
    printf("I am process %s with PID %d\n", VALUE, getpid());
}
int main()
{
    Print("6");
    if(!fork())
    {
        Print("9");
    }
    else
    {
        wait(NULL);
    }
}

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task5b
I am process 6 with PID 21897
I am process 9 with PID 21898
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ █

```

Task No 5 (C)

```

#include <stdio.h>
#include <sys/types.h>
#include <stdlib.h>
#include <sys/wait.h>
#include <unistd.h>
void Print(char *VALUE)
{
    printf("I am process %s with PID %d\n", VALUE, getpid());
}
int main()
{
    Print("8");
    if (!fork())
    {
        Print("0");
        if (!fork())
        {
            Print("7");

```

```

        exit(0);
    }
    else
    {
        if (!fork())
        {
            Print("2");
            exit(0);
        }
        else
        {
            wait(NULL);
        }
        wait(NULL);
    }
    exit(0);
}
}

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task5c
I am process 8 with PID 21921
I am process 0 with PID 21922
I am process 7 with PID 21923
I am process 2 with PID 21924

```

Task No 5 (D)

```

#include <stdio.h>
#include <sys/types.h>
#include <stdlib.h>
#include <sys/wait.h>
#include <unistd.h>
void Print(char *VALUE)
{
    printf("I am process %s with PID %d\n", VALUE, getpid());
}
int main()
{
    Print("Root");
    if (!fork())
    {
        Print("Inner Node");
        if (!fork())
        {
            Print("Leaf");
        }
    }
}

```



```

        exit(0);
    }
    else
    {
        if (!fork())
        {
            Print("Leaf");
            exit(0);
        }
        wait(NULL);
    }
    exit(0);
}
else
{
    if (!fork())
    {
        Print("Leaf");
        exit(0);
    }
    else
    {
        wait(NULL);
    }
}
}

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task5d
I am process Root with PID 21978
I am process Inner Node with PID 21979
I am process Leaf with PID 21980
I am process Leaf with PID 21981
I am process Leaf with PID 21982
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ █

```

Task No 5 (E)

```

#include <stdio.h>
#include <sys/types.h>
#include <stdlib.h>
#include <sys/wait.h>
#include <unistd.h>
void Print(char *VALUE)
{
    printf("I am process %s with PID %d\n", VALUE, getpid());
}

```

```

}
int main()
{
    Print("10");
    if (!fork())
    {
        Print("6");
        if (!fork())
        {
            Print("4");
            exit(0);
        }
        else
        {
            if (!fork())
            {
                Print("8");
                exit(0);
            }
            else
            {
                wait(NULL);
            }
            wait(NULL);
        }
        exit(0);
    }
    else
    {
        if (!fork())
        {
            Print("18");
            if (!fork())
            {
                Print("15");
                exit(0);
            }
            else
            {
                if (!fork())
                {
                    Print("21");
                    exit(0);
                }
            }
        }
    }
}

```

```

        }
        else
        {
            wait(NULL);
        }
        wait(NULL);
    }
    exit(0);
}
else
{
    wait(NULL);
}
}
}

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task5e
I am process 10 with PID 22062
I am process 6 with PID 22063
I am process 18 with PID 22064
I am process 4 with PID 22065
I am process 8 with PID 22066
I am process 21 with PID 22068
I am process 15 with PID 22067
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ █

```

Task No 5 (F)

```

#include <stdio.h>
#include <sys/types.h>
#include <stdlib.h>
#include <sys/wait.h>
#include <unistd.h>
void Print(char *VALUE)
{
    printf("I am process %s with PID %d\n", VALUE, getpid());
}
int main()
{
    Print("A");
    if (!fork())
    {
        Print("B");
        if (!fork())
        {

```

```
        Print("D");
        exit(0);
    }
    else
    {
        wait(NULL);
    }
    exit(0);
}
else
{
    if (!fork())
    {
        Print("C");
        if(!fork())
        {
            Print("E");
            exit(0);
        }
        else
        {
            if(!fork())
            {
                Print("F");
                exit(0);
            }
            else
            {
                wait(NULL);
            }
            wait(NULL);
        }
        exit(0);
    }
    else
    {
        wait(NULL);
    }
    wait(NULL);
}
}
```

```
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task5f
I am process A with PID 22083
I am process B with PID 22084
I am process C with PID 22085
I am process D with PID 22086
I am process E with PID 22087
I am process F with PID 22088
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$
```

Task No 5 (G)

```
#include <stdio.h>
#include <sys/types.h>
#include <stdlib.h>
#include <sys/wait.h>
#include <unistd.h>
void printNameAndPid(char *VALUE)
{
    printf("I am process %s with PID %d\n", VALUE, getpid());
}
int main()
{
    printNameAndPid("A");
    if (!fork())
    {
        printNameAndPid("B");
        if (!fork())
        {
            printNameAndPid("E");
            exit(0);
        }
        else
        {
            wait(NULL);
        }
        exit(0);
    }
    else
    {
        if (!fork())
        {
            printNameAndPid("C");
            if (!fork())
            {
```

```

        printNameAndPid("F");
        exit(0);
    }
    else
    {
        if (!fork())
        {
            printNameAndPid("G");
            exit(0);
        }
        else
        {
            wait(NULL);
        }
        wait(NULL);
    }
    exit(0);
}
else
{
    if (!fork())
    {
        printNameAndPid("D");
        exit(0);
    }
    else
    {
        wait(NULL);
    }
    wait(NULL);
}
}
}

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task5g
I am process A with PID 22095
I am process B with PID 22096
I am process C with PID 22097
I am process D with PID 22098
I am process E with PID 22099
I am process G with PID 22101
I am process F with PID 22100
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ █

```

Task No 5 (H)

```
#include <stdio.h>
#include <sys/types.h>
#include <stdlib.h>
#include <sys/wait.h>
#include <unistd.h>
void Print(char *VALUE)
{
    printf("I am process %s with PID %d\n", VALUE, getpid());
}
int main()
{
    Print("A");
    if (!fork())
    {
        Print("B");
        if (!fork())
        {
            Print("E");
            exit(0);
        }
        else
        {
            if (!fork())
            {
                Print("F");
                exit(0);
            }
            else
            {
                wait(NULL);
            }
            wait(NULL);
        }
        exit(0);
    }
    else
    {
        if (!fork())
        {
            Print("C");
            exit(0);
        }
    }
}
```

```

    }
    else
    {
        if (!fork())
        {
            Print("D");
            if (!fork())
            {
                Print("G");
                exit(0);
            }
            else
            {
                if (!fork())
                {
                    Print("H");
                    exit(0);
                }
                else
                {
                    wait(NULL);
                }
                wait(NULL);
            }
            exit(0);
        }
        else
        {
            wait(NULL);
        }
    }
    wait(NULL);
}
}

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task5h
I am process A with PID 21790
I am process B with PID 21791
I am process C with PID 21792
I am process D with PID 21793
I am process F with PID 21795
I am process E with PID 21794
I am process H with PID 21797
I am process G with PID 21796

```


Task No 5 (I)

```
#include<stdio.h>
#include<sys/types.h>
#include<stdlib.h>
#include<sys/wait.h>
#include<unistd.h>
void Print(char* VALUE) {
    printf("I am process %s with PID %d\n", VALUE, getpid());
}
int main()
{
    Print("1");
    if (!fork()) {
        Print("2");
        if (!fork()) {
            Print("4");
            if (!fork()) {
                Print("8");
                exit(0);
            } else {
                if (!fork()) {
                    Print("9");
                    exit(0);
                } else {
                    wait(NULL);
                }
                wait(NULL);
            }
            exit(0);
        } else {
            if (!fork()) {
                Print("5");
                exit(0);
            } else {
                wait(NULL);
            }
            wait(NULL);
        }
        exit(0);
    } else {
        if (!fork()) {
            Print("3");
```

```

        if (!fork()) {
            Print("6");
            exit(0);
        } else {
            if (!fork()) {
                Print("7");
                exit(0);
            } else {
                wait(NULL);
            }
            wait(NULL);
        }
        exit(0);
    } else {
        wait(NULL);
    }
    wait(NULL);
}
}

```

```

ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ ./Task5i
I am process 1 with PID 22127
I am process 2 with PID 22128
I am process 3 with PID 22129
I am process 4 with PID 22130
I am process 8 with PID 22134
I am process 5 with PID 22132
I am process 9 with PID 22135
I am process 6 with PID 22131
I am process 7 with PID 22133
ammansoomro@Amman-PC:~/Visual_Studio/Lab 4$ █

```