

OPERATING SYSTEM

LAB MANUAL: 5

What is the output of the following codes?

Question: 1

```
#include <stdio.h>
#include <unistd.h>
int main()
{
    if (fork() || fork())
        fork();
    printf("1 ");
    return 0;
}
```

Input:

```
nimra@ubuntu:~/Desktop$ cat > ques1.c
#include <stdio.h>
#include <unistd.h>
int main(){
if (fork() || fork())
    fork();
printf("1 ");
return 0;
}
```

Output:

```
nimra@ubuntu:~/Desktop$ gcc -o ques1 ques1.c
nimra@ubuntu:~/Desktop$ ./ques1
1 nimra@ubuntu:~/Desktop$ 1 1 1 1
```

Question: 2

```
#include <stdio.h>
#include <unistd.h>
int main()
{
    if (fork() && (!fork())) {
        if (fork() || fork()) {
            fork();
        }
    }
    printf("2 ");
    return 0;
}
```

Input:

```
nimra@ubuntu:~/Desktop$ cat > ques2.c
#include <stdio.h>
#include <unistd.h>
int main()
{
    if (fork() && (!fork())){
    if (fork() || fork()){
    fork();
    }
    }
    printf("2 ");
    return 0;
}
```

Output:

```
nimra@ubuntu:~/Desktop$ gcc -o ques2 ques2.c
nimra@ubuntu:~/Desktop$ ./ques2
2 2 nimra@ubuntu:~/Desktop$ 2 2 2 2 2
nimra@ubuntu:~/Desktop$
```

Question: 3

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

int main()
{
    // make two process which run same
    // program after this instruction
    fork();

    printf("Hello world!\n");
    return 0;
}
```

Input:

```
nimra@ubuntu:~/Desktop$ cat > ques3.c
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
int main()
{
    // make two process which run same
    // program after this instruction

    fork();

    printf("Hello World!\n");
    return 0;
}
```

Output:

```
nimra@ubuntu:~/Desktop$ gcc -o ques3 ques3.c
nimra@ubuntu:~/Desktop$ ./ques3
Hello World!
Hello World!
nimra@ubuntu:~/Desktop$
```

Question: 4

```
#include <stdio.h>
#include <sys/types.h>
int main()
{
    fork();
    fork();
    fork();
    printf("hello\n");
    return 0;
}
```

Input:

```
nimra@ubuntu:~/Desktop$ cat > ques4.c
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
int main()
{
    fork();
    fork();
    fork();
    printf("Hello\n");
    return 0;
}
```

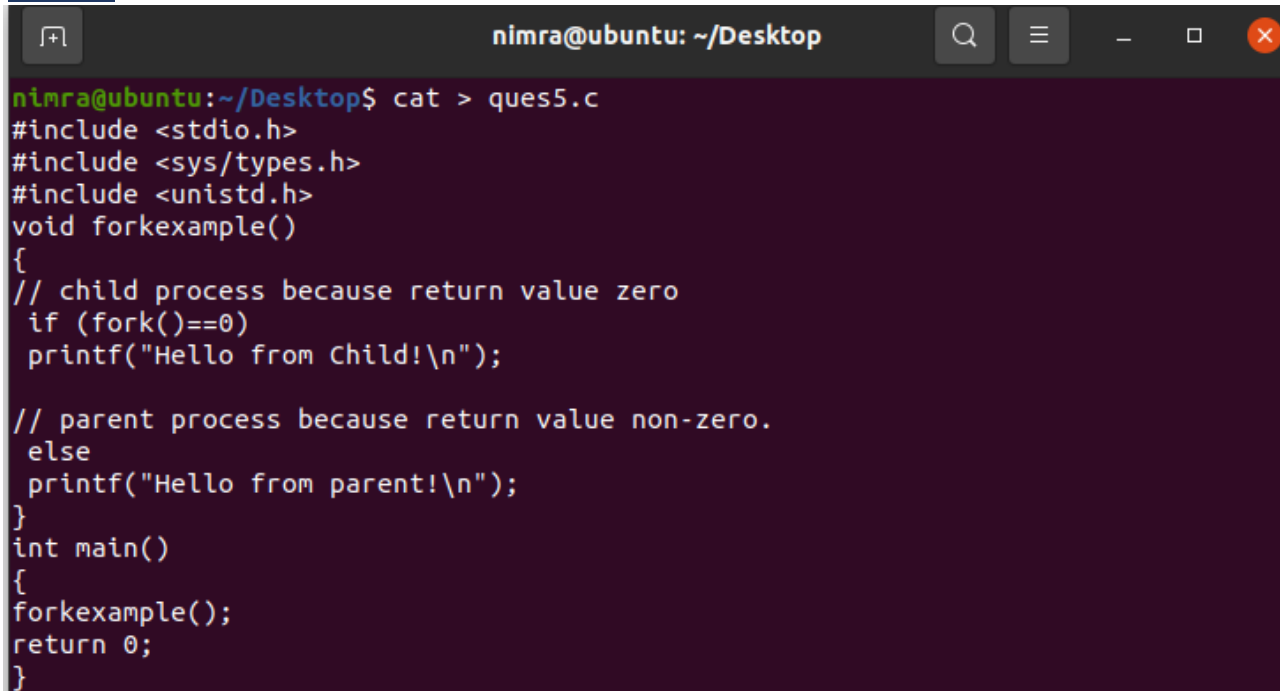
Output:

```
nimra@ubuntu:~/Desktop$ gcc -o ques4 ques4.c
nimra@ubuntu:~/Desktop$ ./ques4
Hello
Hello
Hello
nimra@ubuntu:~/Desktop$ Hello
Hello
Hello
Hello
Hello
```

Question: 5

```
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
void forkexample()
{
    // child process because return value zero
    if (fork() == 0)
        printf("Hello from Child!\n");
    // parent process because return value non-zero.
    else
        printf("Hello from Parent!\n");
}
int main()
{
    forkexample();
    return 0;
}
```

Input:

A terminal window titled 'nimra@ubuntu: ~/Desktop' with search, menu, and window control icons. The prompt is 'nimra@ubuntu:~/Desktop\$'. The user has entered 'cat > ques5.c' and the contents of the file are displayed. The code is identical to the one in the previous block.

```
nimra@ubuntu:~/Desktop$ cat > ques5.c
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
void forkexample()
{
    // child process because return value zero
    if (fork()==0)
        printf("Hello from Child!\n");

    // parent process because return value non-zero.
    else
        printf("Hello from parent!\n");
}
int main()
{
    forkexample();
    return 0;
}
```

Output:

```
nimra@ubuntu:~/Desktop$ gcc -o ques5 ques5.c
nimra@ubuntu:~/Desktop$ ./ques5
Hello from parent!
Hello from Child!
nimra@ubuntu:~/Desktop$
```

Question: 6

```
#include <stdio.h>
#include <sys/types.h>
int main()
{
    fork();
    printf("Ali!\n");
    fork();
    printf("Ahmed!\n");
    fork();
    printf("hello\n");
    return 0;
}
```

Input:

A terminal window titled "nimra@ubuntu: ~" with search, menu, and window control icons. It shows the command "cat > ques6.c" and the following C code:

```
nimra@ubuntu:~$ cat > ques6.c
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
int main()
{
    fork();
    printf("Ali!\n");
    fork();
    printf("Ahmed!\n");
    fork();
    printf("hello\n");
    return 0;
}
```

Output:

```
nimra@ubuntu:~$ gcc -o ques6 ques6.c
nimra@ubuntu:~$ ./ques6
Ali!
Ali!
Ahmed!
Ahmed!
hello
hello
nimra@ubuntu:~$ hello
Ahmed!
hello
hello
hello
Ahmed!
hello
hello
nimra@ubuntu:~$
```

Question: 7

```
#include <stdio.h>
#include <sys/types.h>
int main()

{

fork();
printf("Ali!\n");

    fork();

printf("Ahmed!\n");
    fork();

    printf("hello\n");
    return 0;

}
```

Input:

```
nimra@ubuntu: ~/Desktop
nimra@ubuntu:~/Desktop$ cat > ques7.c
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
int main()
{
fork();
printf("Ali!\n");
fork();
printf("Ahmed!\n");
fork();
printf("hello\n");
return 0;
}
```

Output:

```
nimra@ubuntu:~/Desktop$ gcc -o ques7 ques7.c
nimra@ubuntu:~/Desktop$ ./ques7
Ali!
Ahmed!
Ali!
hello
Ahmed!
hello
hello
nimra@ubuntu:~/Desktop$ hello
Ahmed!
hello
Ahmed!
hello
hello
hello
```

Question: 8

#include <stdio.h>

#include <sys/types.h>

int main()


```
{
    fork();

    fork();

    printf("Ali!\n");

    fork();

    fork();

    printf("Ahmed!\n");

    fork();

    printf("hello\n");

    return 0;
}
```

Input:

```
nimra@ubuntu:~/Desktop$ cat > ques8.c
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
int main()
{
    fork();
    fork();
    printf("Ali!\n");
    fork();
    fork();
    printf("Ahmed!\n");
    fork();
    printf("hello\n");
    return 0;
}
```

Output:

```
nimra@ubuntu:~/Desktop$ gcc -o ques8 ques8.c
nimra@ubuntu:~/Desktop$ ./ques8
Ali!
Ali!
Ahmed!
Ahmed!
hello
hello
hello
nimra@ubuntu:~/Desktop$ hello
Ahmed!
hello
Ahmed!
Ahmed!
hello
hello
Ahmed!
hello
Ali!
hello
Ahmed!
hello
hello
Ahmed!
hello
hello
```

```
hello
Ali!
Ahmed!
hello
Ahmed!
hello
hello
hello
Ahmed!
hello
hello
hello
Ahmed!
hello
hello
Ahmed!
Ahmed!
hello
hello
hello
Ahmed!
hello
hello
Ahmed!
hello
```

```
hello
hello
hello
hello
```

```
nimra@ubuntu:~/Desktop$ █
```

Question: 9

```
#include <stdio.h>
#include <sys/types.h>
int main()
{
    fork();
    fork();
    fork();
    fork();
    printf("hello\n");
    return 0;
}
```

Input:

```
nimra@ubuntu:~/Desktop$ cat > ques9.c
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
int main()
{
fork();
fork();
fork();
fork();
printf("hello\n");
return 0;
}
```

Output:

```
nimra@ubuntu:~/Desktop$ gcc -o ques9 ques9.c
nimra@ubuntu:~/Desktop$ ./ques9
hello
hello
hello
nimra@ubuntu:~/Desktop$ hello
hello
hello
hello
hello
hello
hello
hello
hello
hello
hello
hello
hello
```

Question: 10

```
#include <stdio.h>
#include <sys/types.h>
int main()
{
    fork();
    fork();
    fork();
    printf("hello\n");
    fork();
    fork();
    printf("Pakistan")
    return 0;
}
```

Input:

```
nimra@ubuntu:~/Desktop$ cat > ques10.c
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
int main()
{
    fork();
    fork();
    fork();
    printf("hello\n");
    fork();
    fork();
    printf("Pakistan");
    return 0;
}
```

Output:

```
nimra@ubuntu:~/Desktop$ gcc -o ques10 ques10.c
nimra@ubuntu:~/Desktop$ ./ques10
hello
hello
Pakistan Pakistan Pakistan Pakistan Pakistan nimra@ubuntu:~/Desktop$ Pakistan Pa
kistan Pakistan hello
Pakistan Pakistan hello
Pakistan hello
Pakistan Pakistan Pakistan Pakistan Pakistan Pakistan hello
Pakistan Pakistan hello
Pakistan Pakistan hello
Pakistan Pakistan Pakistan Pakistan Pakistan Pakistan Pakistan Pakistan
Pakistan Pakistan
```