

1) Type the following code and observe the output to know the working of increment and decrement operators

```
#include <stdio.h>

int main()
{
    int a = 10, b = 100;

    float c = 10.5, d = 100.5;

    printf("++a = %d \n", ++a);

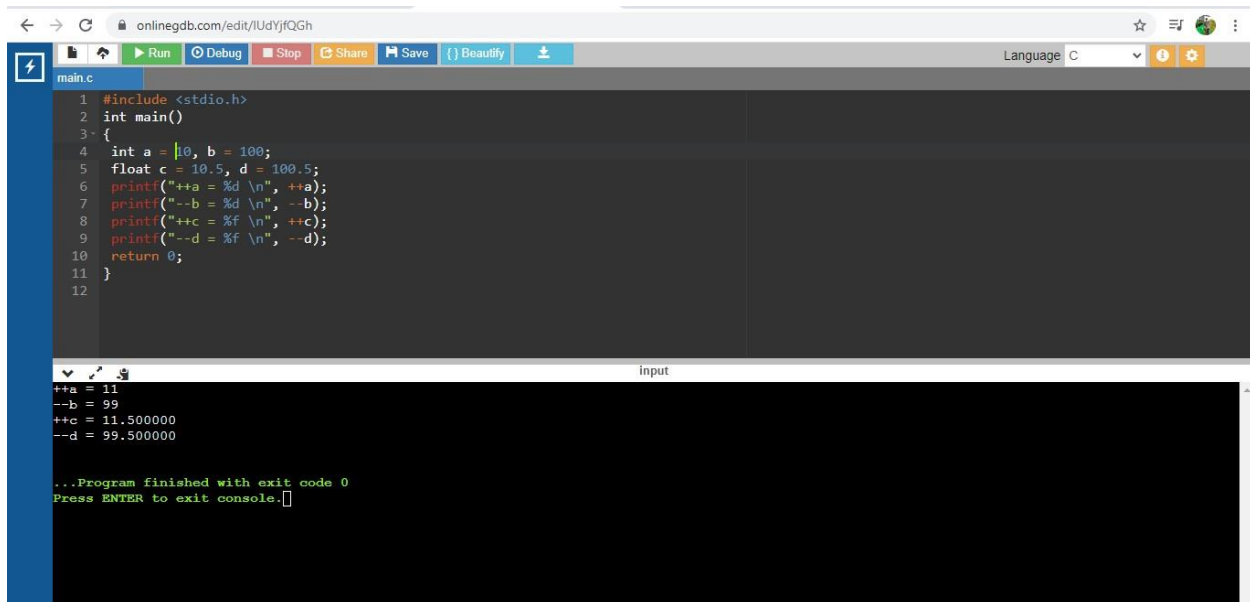
    printf("--b = %d \n", --b);

    printf("++c = %f \n", ++c);

    printf("--d = %f \n", --d);

    return 0;
}
```

Output:

The screenshot shows a web browser window with an online C compiler interface. The code editor contains the same C program as shown in the previous block. The output window displays the results of the program's execution. The output shows that ++a results in 11, --b results in 99, ++c results in 11.500000, and --d results in 99.500000. The program finished with exit code 0.

```
main.c
1 #include <stdio.h>
2 int main()
3 {
4     int a = 10, b = 100;
5     float c = 10.5, d = 100.5;
6     printf("++a = %d \n", ++a);
7     printf("--b = %d \n", --b);
8     printf("++c = %f \n", ++c);
9     printf("--d = %f \n", --d);
10    return 0;
11 }
12

Input

++a = 11
--b = 99
++c = 11.500000
--d = 99.500000

...Program finished with exit code 0
Press ENTER to exit console.
```

2) Type the following code and observe the output to know the working of relational operators

```
#include <stdio.h>

int main()
{
    int a = 5, b = 5, c = 10;
```

```

printf("%d == %d is %d \n", a, b, a == b);
printf("%d == %d is %d \n", a, c, a == c);
printf("%d > %d is %d \n", a, b, a > b);
printf("%d > %d is %d \n", a, c, a > c);
printf("%d < %d is %d \n", a, b, a < b);
printf("%d < %d is %d \n", a, c, a < c);
printf("%d != %d is %d \n", a, b, a != b);
printf("%d != %d is %d \n", a, c, a != c);
printf("%d >= %d is %d \n", a, b, a >= b);
printf("%d >= %d is %d \n", a, c, a >= c);
printf("%d <= %d is %d \n", a, b, a <= b);
printf("%d <= %d is %d \n", a, c, a <= c);

return 0;
}

```

Output:

```

main.c
1 #include <stdio.h>
2 int main()
3 {
4     int a = 5, b = 5, c = 10;
5     printf("%d == %d is %d \n", a, b, a == b);
6     printf("%d == %d is %d \n", a, c, a == c);
7     printf("%d > %d is %d \n", a, b, a > b);
8     printf("%d > %d is %d \n", a, c, a > c);
9     printf("%d < %d is %d \n", a, b, a < b);
10    printf("%d < %d is %d \n", a, c, a < c);

```

Input

```

5 == 5 is 1
5 == 10 is 0
5 > 5 is 0
5 > 10 is 0
5 < 5 is 0
5 < 10 is 1
5 != 5 is 0
5 != 10 is 1
5 >= 5 is 1
5 >= 10 is 0
5 <= 5 is 1
5 <= 10 is 1

...Program finished with exit code 0
Press ENTER to exit console.

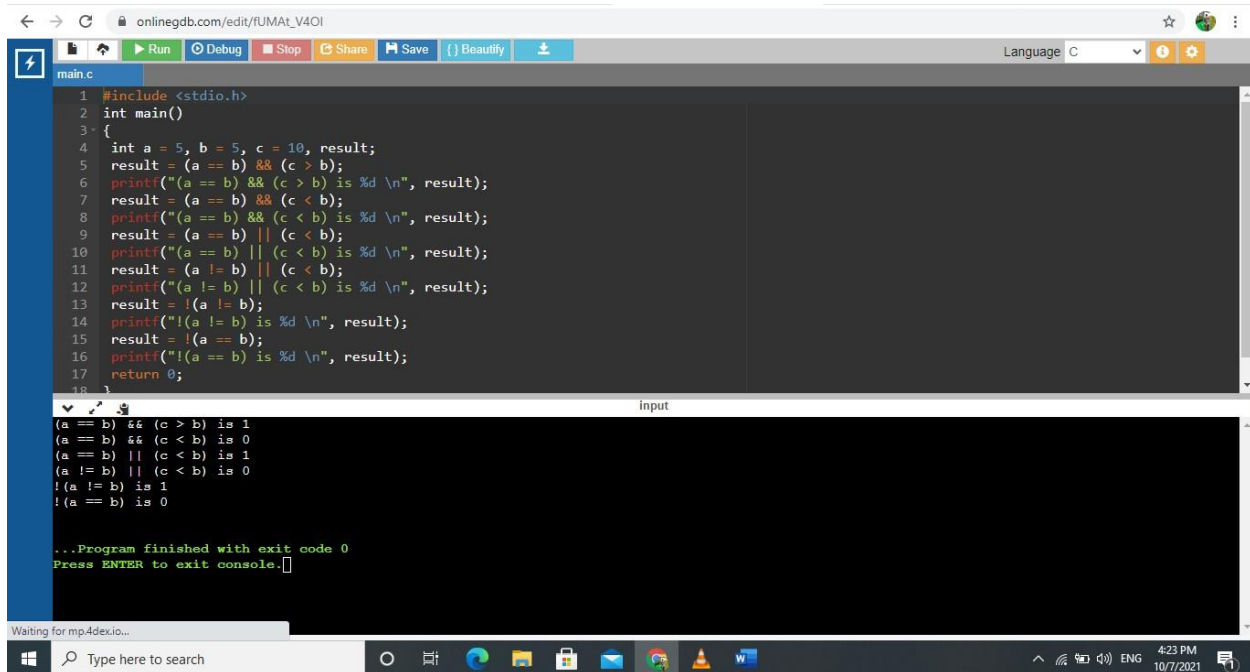
```

3) Type the following code and observe the output to know the working of logical operators

```
#include <stdio.h>
```

```
int main()
{
    int a = 5, b = 5, c = 10, result;
    result = (a == b) && (c > b);
    printf("(a == b) && (c > b) is %d \n", result);
    result = (a == b) && (c < b);
    printf("(a == b) && (c < b) is %d \n", result);
    result = (a == b) || (c < b);
    printf("(a == b) || (c < b) is %d \n", result);
    result = (a != b) || (c < b);
    printf("(a != b) || (c < b) is %d \n", result);
    result = !(a != b);
    printf("(a != b) is %d \n", result);
    result = !(a == b);
    printf("(a == b) is %d \n", result);
    return 0;
}
```

Output:



The screenshot shows a web browser window with the URL `onlinegdb.com/edit/FUMAt_V4OI`. The browser's address bar and tabs are visible. Below the browser window, there is a Windows taskbar with various icons and the system clock showing 4:23 PM on 10/7/2021.

The main content area displays a C program in a dark-themed editor. The program is named `main.c` and contains the following code:

```
1 #include <stdio.h>
2 int main()
3 {
4     int a = 5, b = 5, c = 10, result;
5     result = (a == b) && (c > b);
6     printf("(a == b) && (c > b) is %d \n", result);
7     result = (a == b) && (c < b);
8     printf("(a == b) && (c < b) is %d \n", result);
9     result = (a == b) || (c < b);
10    printf("(a == b) || (c < b) is %d \n", result);
11    result = (a != b) || (c < b);
12    printf("(a != b) || (c < b) is %d \n", result);
13    result = !(a != b);
14    printf("(!(a != b) is %d \n", result);
15    result = !(a == b);
16    printf("(!(a == b) is %d \n", result);
17    return 0;
18 }
```

Below the code editor, the output of the program is displayed in a console window. The output shows the results of the logical expressions for each line of code:

```
(a == b) && (c > b) is 1
(a == b) && (c < b) is 0
(a == b) || (c < b) is 1
(a != b) || (c < b) is 0
!(a != b) is 1
!(a == b) is 0

...Program finished with exit code 0
Press ENTER to exit console.
```

4) Write a C program that displays the size of all possible data types in C

```
#include <stdio.h>
```

```
int main()
```

```
{
```

```
    printf("int is  %2d bytes \n", sizeof(short int));
```

```
    printf("long int is  %2d bytes \n", sizeof(long int));
```

```
    printf("float is  %2d bytes \n", sizeof(float));
```

```
    printf("double is  %2d bytes \n", sizeof(double));
```

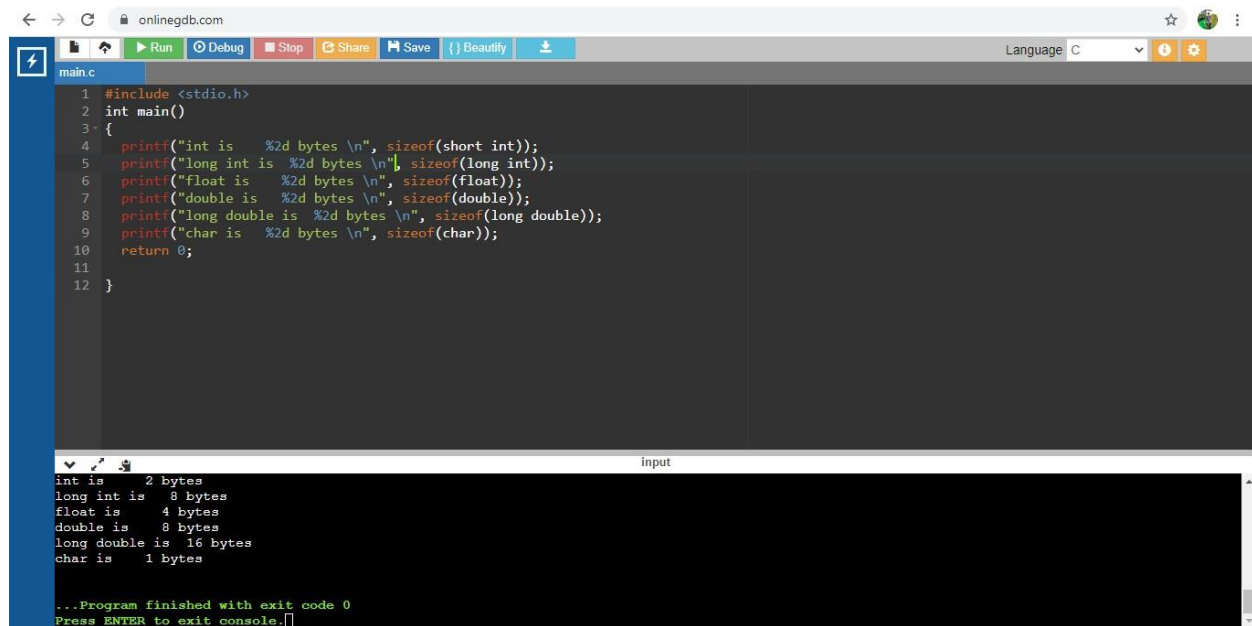
```
    printf("long double is  %2d bytes \n", sizeof(long double));
```

```
    printf("char is  %2d bytes \n", sizeof(char));
```

```
    return 0;
```

```
}
```

Output:



```
1 #include <stdio.h>
2 int main()
3 {
4     printf("int is %2d bytes \n", sizeof(short int));
5     printf("long int is %2d bytes \n", sizeof(long int));
6     printf("float is %2d bytes \n", sizeof(float));
7     printf("double is %2d bytes \n", sizeof(double));
8     printf("long double is %2d bytes \n", sizeof(long double));
9     printf("char is %2d bytes \n", sizeof(char));
10    return 0;
11 }
12
```

int is 2 bytes
long int is 8 bytes
float is 4 bytes
double is 8 bytes
long double is 16 bytes
char is 1 bytes

...Program finished with exit code 0
Press ENTER to exit console.

5) Let the variable num=22. Show the working (on paper) of left shift operator on num, i.e. num<<1,num<<2.... Validate the results by writing a program. Repeat the above to see the working of right shift operator as well

num<<1

```
#include <stdio.h>
```

```
int main()
```

```
{
```

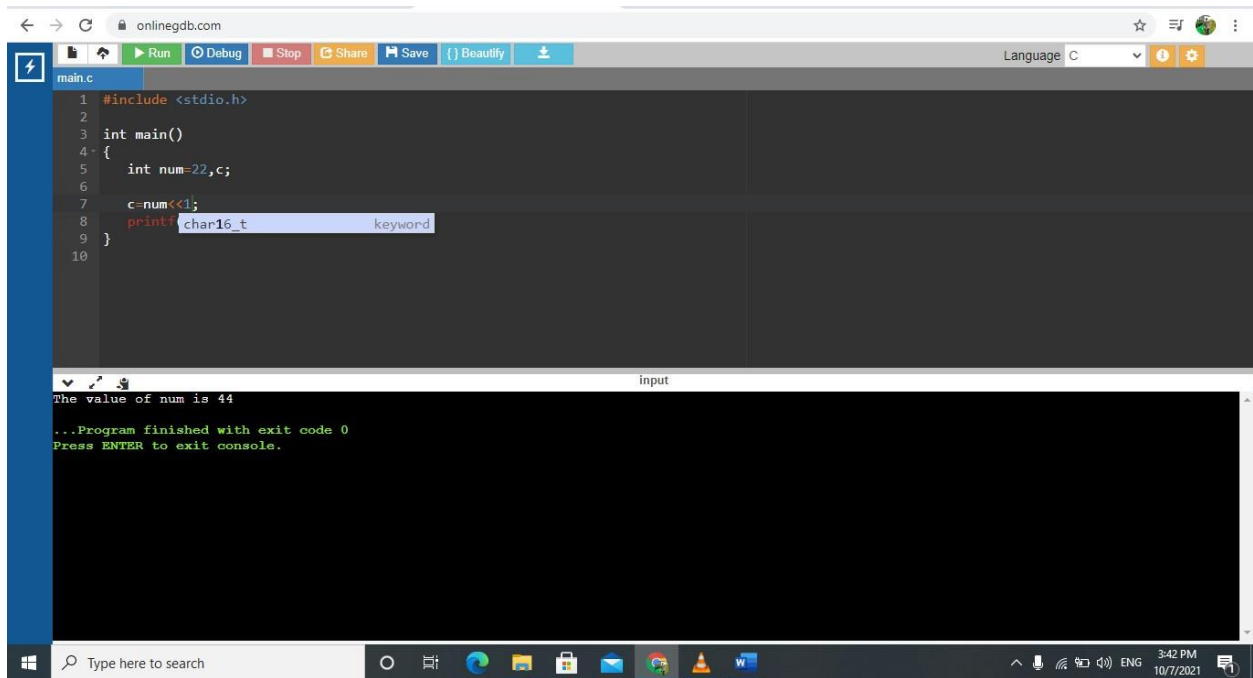
```
    int num=22,c;
```

```
    c=num<<1;
```

```
    printf("The value of num is %d",c);
```

```
}
```

Output:



The screenshot shows a web browser window with the URL `onlinegdb.com`. The browser's address bar and tabs are visible. Below the browser, there is a code editor interface. The editor has a toolbar with buttons for Run, Debug, Stop, Share, Save, and Beautify. The language is set to C. The code in the editor is as follows:

```
1 #include <stdio.h>
2
3 int main()
4 {
5     int num=22,c;
6
7     c=num<<1;
8     printf("The value of num is %d",c);
9 }
10
```

The output window at the bottom shows the following text:

```
The value of num is 44
...Program finished with exit code 0
Press ENTER to exit console.
```

The Windows taskbar is visible at the bottom of the screen, showing the search bar and various application icons.

Num<<2

`#include <stdio.h>`

`int main()`

`{`

`int num=22,c;`

`c=num<<2;`

`printf("The value of num is %d",c);`

`}`

Output:

```
1 #include <stdio.h>
2
3 int main()
4 {
5     int num=22,c;
6
7     c=num<<2;
8     printf("The value of num is %d",c);
9 }
10
```

The value of num is 88

...Program finished with exit code 0
Press ENTER to exit console.

Num>>1

```
#include <stdio.h>
```

```
int main()
```

```
{
```

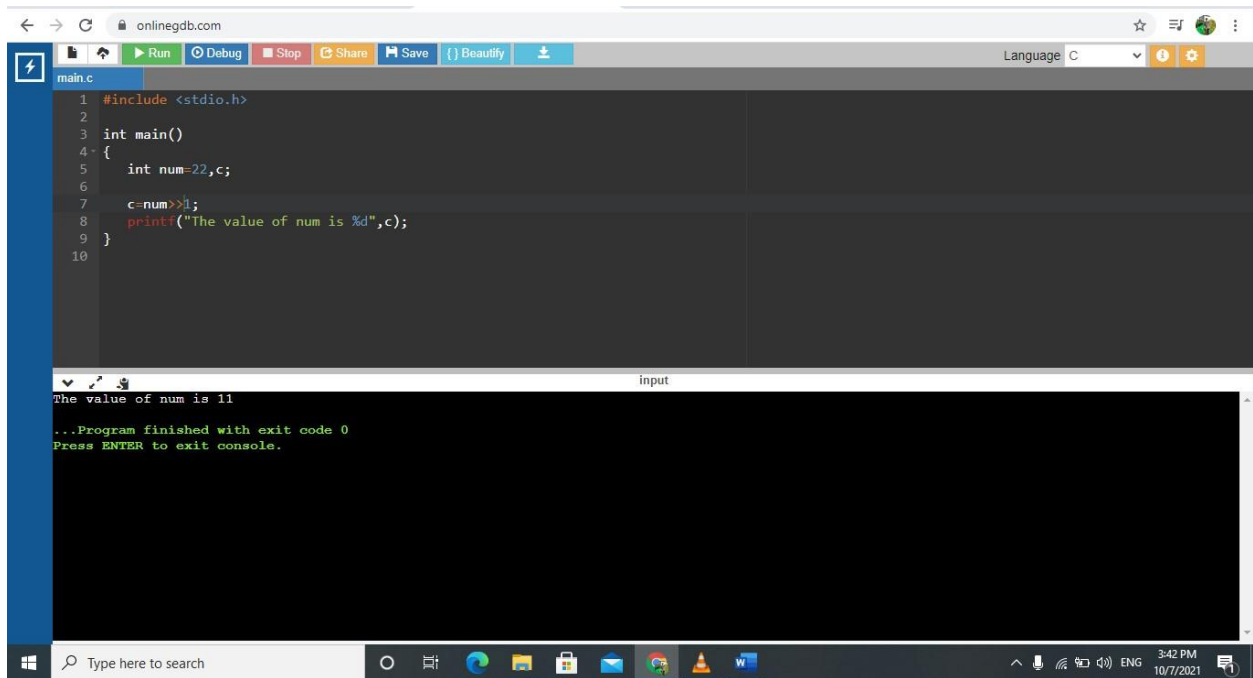
```
    int num=22,c;
```

```
    c=num>>1;
```

```
    printf("The value of num is %d",c);
```

```
}
```

Output:



The screenshot shows a web browser window with the URL `onlinegdb.com`. The browser's address bar and tabs are visible. The main content area displays a C program in a dark-themed editor. The code is as follows:

```
1 #include <stdio.h>
2
3 int main()
4 {
5     int num=22,c;
6
7     c=num>>1;
8     printf("The value of num is %d",c);
9 }
10
```

Below the code editor, there is a console window titled "input". It shows the output of the program:

```
The value of num is 11
...Program finished with exit code 0
Press ENTER to exit console.
```

The Windows taskbar is visible at the bottom of the screen, showing the search bar and various application icons.

Num>>2

```
#include <stdio.h>
```

```
int main()
```

```
{
```

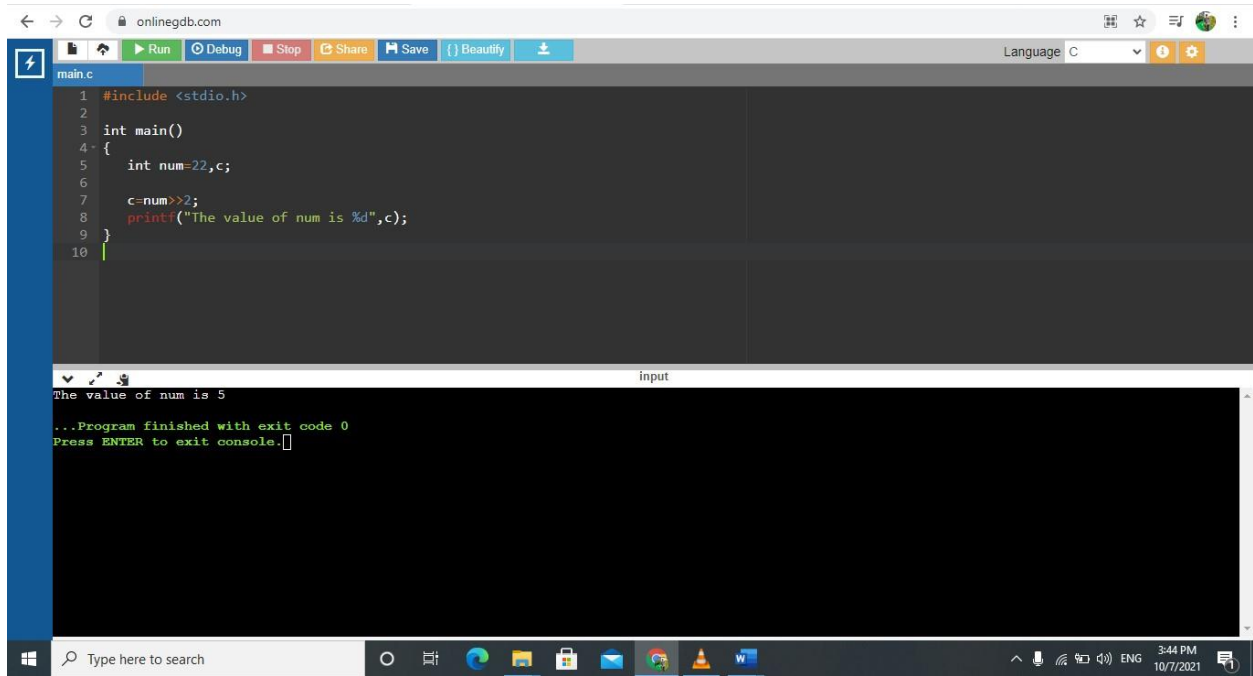
```
    int num=22,c;
```

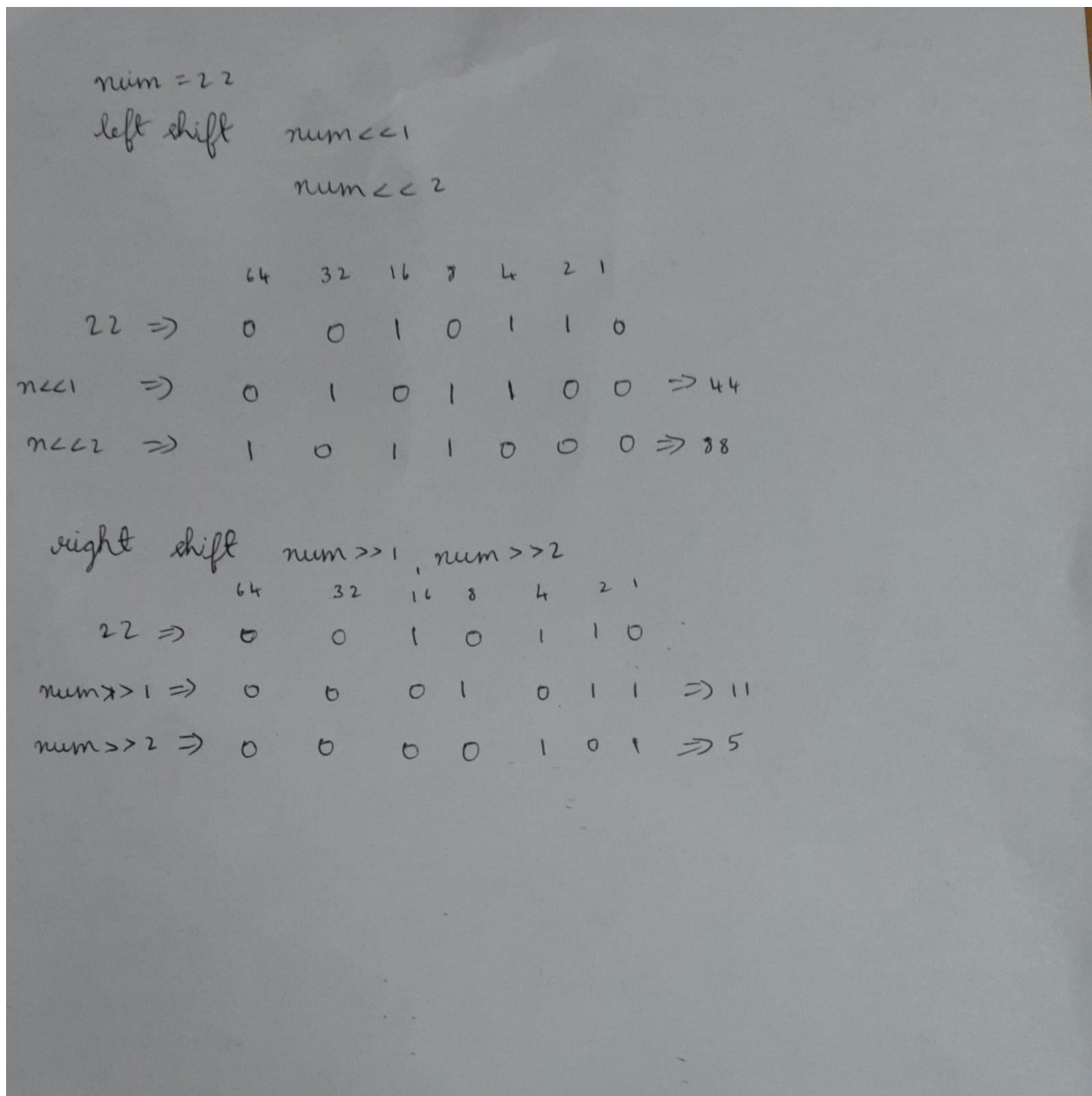
```
    c=num>>2;
```

```
    printf("The value of num is %d",c);
```

```
}
```

Output:





6) Write a program to determine the largest of two numbers using ternary operator. Enhance the code to determine largest of three numbers. (if statements are not allowed)

```
#include <stdio.h>
```

```
int main()
```

```
{
```

```
    int a, b, large;
```

```

printf("Enter 2 numbers\n");

scanf("%d%d", &a, &b);

(a > b) ? (large = a) : (large = b);

printf("largest of %d and %d is %d\n", a, b, large);

return 0;
}

```

Output:

The screenshot shows the onlinegdb.com interface. The code editor contains the following C code:

```

1 #include <stdio.h>
2
3 int main()
4 {
5     int a, b, large;
6
7     printf("Enter 2 numbers\n");
8     scanf("%d%d", &a, &b);
9
10    (a > b) ? (large = a) : (large = b);
11
12    printf("largest of %d and %d is %d\n", a, b, large);
13
14    return 0;
15 }
16

```

The output console shows the following text:

```

Enter 2 numbers
1
2
largest of 1 and 2 is 2

...Program finished with exit code 0
Press ENTER to exit console.

```

```
# include <stdio.h>
```

```
void main()
```

```
{
```

```
int a, b, c, large ;
```

```
printf("Enter three numbers : " );
```

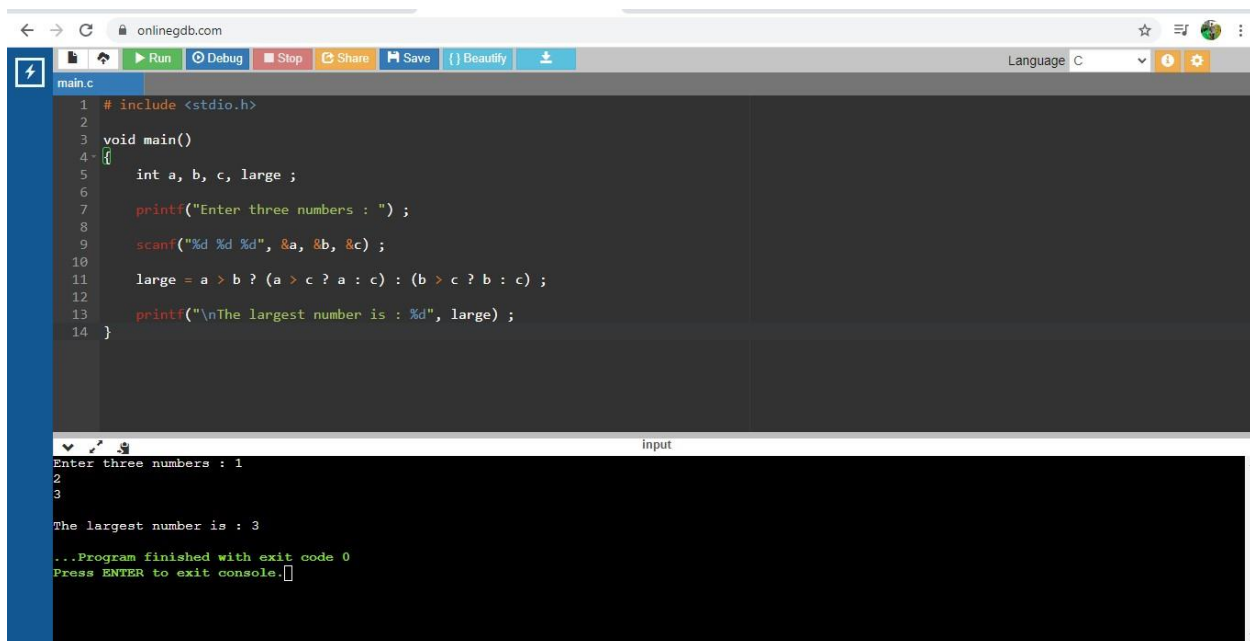
```
scanf("%d %d %d", &a, &b, &c) ;
```

```
large = a > b ? (a > c ? a : c) : (b > c ? b : c) ;
```

```
printf("\nThe largest number is : %d", large) ;
```

```
}
```

Output:



The screenshot shows a web browser window with the URL `onlinegdb.com`. The interface includes a toolbar with buttons for Run, Debug, Stop, Share, Save, and Beautify. The code editor displays a C program that prompts the user to enter three numbers, reads them using `scanf`, calculates the largest number using a ternary operator, and prints the result using `printf`. The console output shows the program's execution with the input values 1, 2, and 3, resulting in the output "The largest number is : 3".

```
1 #include <stdio.h>
2
3 void main()
4 {
5     int a, b, c, large ;
6
7     printf("Enter three numbers : ") ;
8
9     scanf("%d %d %d", &a, &b, &c) ;
10
11     large = a > b ? (a > c ? a : c) : (b > c ? b : c) ;
12
13     printf("\nThe largest number is : %d", large) ;
14 }
```

Enter three numbers : 1
2
3
The largest number is : 3
...Program finished with exit code 0
Press ENTER to exit console.