

FAST

National University of Computer and Emerging Sciences Peshawar

OOP Lab # 2.3

C++ Math

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Programming



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C++ Math



C++ has many functions that allows you to perform mathematical tasks on numbers.



Max and min

The `max(x,y)` function can be used to find the highest value of x and y:

Example

```
cout << max(5, 10);
```



Max and min...

And the `min(x,y)` function can be used to find the lowest value of x and y:

Example

```
cout << min(5, 10);
```



Max and min Example

```
#include<iostream>
```

```
using namespace std;
```

```
int main()  
{
```

```
    cout<<"Maximum Number is: "<<max(5,8)<<endl;
```

```
    cout<<"Manimum Number is: "<<min(5,8)<<endl;
```

```
    return 0;
```

```
}
```

```
Maximum Number is: 8  
Manimum Number is: 5
```



C++ <cmath> Headers

Other functions, such as **sqrt** (square root), **round** (rounds a number) and **log** (natural logarithm), can be found in the **<cmath>** header file:

Example

```
// Include the cmath library
#include <cmath>

cout << sqrt(64);
cout << round(2.6);
cout << log(2);
```



C++ <cmath> Headers Example

```
#include<iostream>
using namespace std;
#include<cmath>
```

```
int main()
{
```

```
    cout<<"Square root of 64 is: "<<sqrt(64)<<endl;
```

```
    cout<<"log of 2 is: "<<log(2)<<endl;
```

```
    cout<<"Round of 2.6 is: "<<round(2.6)<<endl;
```

```
    return 0;
```

```
}
```

```

Square root of 64 is: 8
log of 2 is: 0.693147
Round of 2.6 is: 3

```




Other Math Functions

A list of other popular Math functions (from the `<cmath>` library) can be found in the table below:

Function	Description
<code>abs(x)</code>	Returns the absolute value of x
<code>acos(x)</code>	Returns the arccosine of x
<code>asin(x)</code>	Returns the arcsine of x
<code>atan(x)</code>	Returns the arctangent of x
<code>cbrt(x)</code>	Returns the cube root of x
<code>ceil(x)</code>	Returns the value of x rounded up to its nearest integer
<code>cos(x)</code>	Returns the cosine of x



Other Math Functions...

<code>cosh(x)</code>	Returns the hyperbolic cosine of x
<code>exp(x)</code>	Returns the value of E^x
<code>expm1(x)</code>	Returns $e^x - 1$
<code>fabs(x)</code>	Returns the absolute value of a floating x
<code>fdim(x, y)</code>	Returns the positive difference between x and y
<code>floor(x)</code>	Returns the value of x rounded down to its nearest integer
<code>hypot(x, y)</code>	Returns $\sqrt{x^2 + y^2}$ without intermediate overflow or underflow



Other Math Functions...

<code>fma(x, y, z)</code>	Returns $x*y+z$ without losing precision
<code>fmax(x, y)</code>	Returns the highest value of a floating x and y
<code>fmin(x, y)</code>	Returns the lowest value of a floating x and y
<code>fmod(x, y)</code>	Returns the floating point remainder of x/y
<code>pow(x, y)</code>	Returns the value of x to the power of y



Other Math Functions...

$\sin(x)$	Returns the sine of x (x is in radians)
$\sinh(x)$	Returns the hyperbolic sine of a double value
$\tan(x)$	Returns the tangent of an angle
$\tanh(x)$	Returns the hyperbolic tangent of a double value



Home Task

In previous slides 23 math functions (Other Math Functions) are listed in the form of table you all are directed to implement all these functions using C++ program. And show me program in running form in upcoming lab. This task carry 10 marks.

Note: Program copied from someone or plagiarized will not be considered for grading. Zero percent tolerance with plagiarism.



References

- <https://beginnersbook.com/2017/08/cpp-data-types/>
- <https://www.geeksforgeeks.org/c-data-types/>
- http://www.cplusplus.com/doc/tutorial/basic_io/
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- <https://www.w3schools.com/cpp/default.asp>
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THANK YOU

