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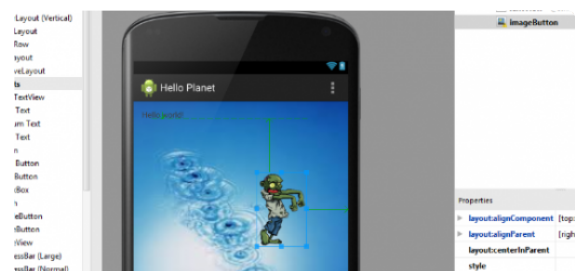
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C++ PROGRAMMING / NUMERICAL ANALYSIS

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C++ Program for Exponential Fitting (Least Squares)

BY MANAS SHARMA · SEPTEMBER 16, 2015

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How to change the background of an App(Activity) using Android Studio? [SOLVED]

10 JUN, 2016

```
//Exponential Fit
#include<iostream>
#include<iomanip>
#include<cmath>
using namespace std;
int main()
{
```

```cpp
    int i,j,k,n;
    cout<<"\nEnter the no. of
data pairs to be entered:\n";
//To find the size of arrays
    cin>>n;
    double
 [n],y[n],lny[n],a,b,c;
    cout<<"\nEnter the x-axis
 alues:\n";
//Input x-values(observed)
    for (i=0;i<n;i++)
        cin>>x[i];
    cout<<"\nEnter the y-axis
values:\n";
//Input y-values(observed)
    for (i=0;i<n;i++)
        cin>>y[i];
    for (i=0;i<n;i++)
//Calculate the values of ln(yi)
        lny[i]=log(y[i]);
    double
xsum=0,x2sum=0,ysum=0,xysum=0;
//variables for sums/sigma of
xi,yi,xi^2,xiyi etc
    for (i=0;i<n;i++)
    {
        xsum=xsum+x[i];
//calculate sigma(xi)
        ysum=ysum+lny[i];
//calculate sigma(yi)
        x2sum=x2sum+pow(x[i],2);
//calculate sigma(x^2i)
        xysum=xysum+x[i]*lny[i];
//calculate sigma(xi*yi)
    }
    a=(n*xysum-
xsum*ysum)/(n*x2sum-xsum*xsum);
//calculate slope(or the the
power of exp)
    b=(x2sum*ysum-
xsum*xysum)/(x2sum*n-xsum*xsum);
//calculate intercept
    c=pow(2.71828,b);
//since b=ln(c)
    double y_fit[n];
//an array to store the new
fitted values of y
    for (i=0;i<n;i++)

y_fit[i]=c*pow(2.71828,a*x[i]);
//to calculate y(fitted) at given
x points
    cout<<"S.no"<<setw(5)<<"x"
<<setw(19)<<"y(observed)"
<<setw(19)<<"y(fitted)"<<endl;
```
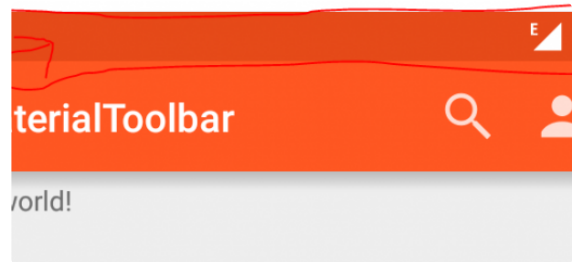
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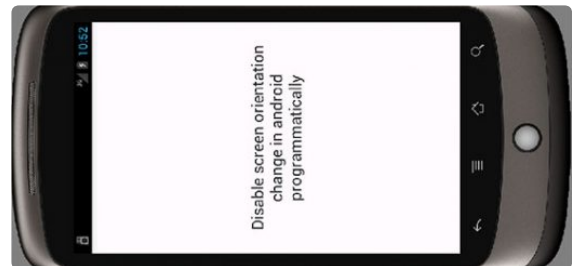### How to make a particular Activity Fullscreen? [Solution] (Android Development)

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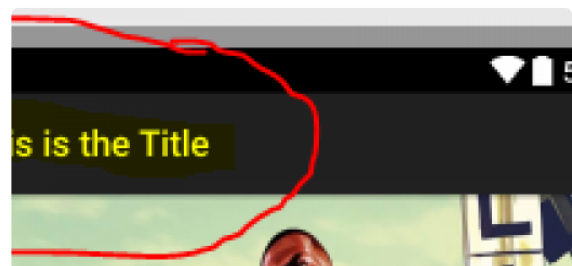### How to change the color of status bar? [Solution] (Android Development)

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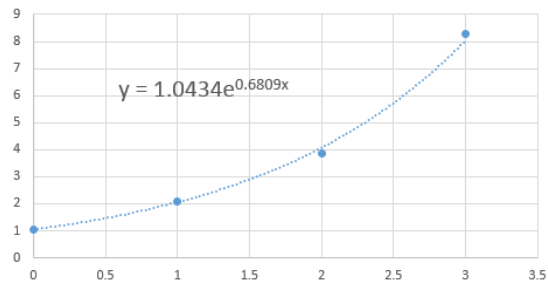
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How to change the title of an

```
    cout<<"----------------------
-----------------------------------
----------\n";
    for (i=0;i<n;i++)
        cout<<i+1<<"."<<setw(8)
<<x[i]<<setw(15)<<y[i]<<setw(18)
<<y_fit[i]<<endl;//print a table
 f x,y(obs.) and y(fit.)
    cout<<"\nThe corresponding
line is of the form:\n\nlny = "
<<a<<"x + ln"<<b<<endl;
    cout<<"\nThe exponential fit
is given by:\ny = "<<c<<"e^"
<<a<<"x\n";
    return 0;
}
```

$$y = 1.0434e^{0.6809x}$$
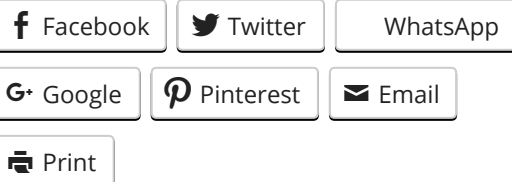
```
Enter the no. of data pairs to be entered:
4

Enter the x-axis values:
0       1       2       3

Enter the y-axis values:
1.05    2.10    3.85    8.30
S.no    x       y(observed)        y(fitted)
---------------------------------------------
1.      0       1.05               1.0434
2.      1       2.1                2.0613
3.      2       3.85               4.07223
4.      3       8.3                8.04493

The corresponding line is of the form:

lny = 0.680853x + ln0.0424843

The exponential fit is given by:
y = 1.0434e^0.680853x
```

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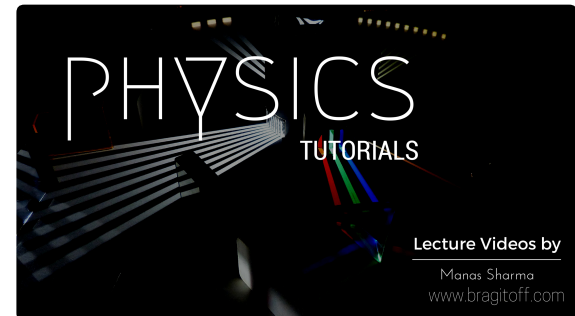- **f** Facebook
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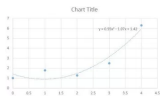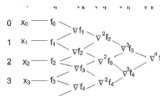## Related

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Manas Sharma

Hey! I am a Physics Major at the University of Delhi. I dream of being a Theoretical Physicist one day. I love playing Guitar in my free time. I can speak English, Hindi and a little French. I am also a Web Development Enthusiast and a hardcore Gamer.

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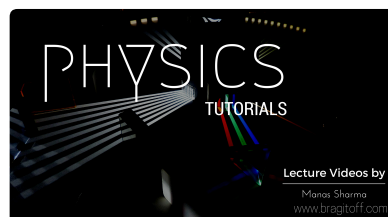
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