

Android For Dummies

Manjunath R

Independent Researcher

#16/1, 8th Main Road, Shivanagar, Rajajinagar, Bangalore: 560010, Karnataka, India
manjunath5496@gmail.com, manjunathr1988@yahoo.in

Abstract: This article provides a precise description of the world's most popular operating system-- the Android which has now garnered the interest of a million smart phone users -- and also highlights some basic knowledge of formal constructed languages (like C, C++ , Java & xml) designed to communicate instructions to a machine, particularly a computer.

[Manjunath. R. **Android For Dummies**. *Academ Arena* 2016;8(3):87-105]. ISSN 1553-992X (print); ISSN 2158-771X (online). <http://www.sciencepub.net/academia>. 12. doi:[10.7537/marsaaj08031612](https://doi.org/10.7537/marsaaj08031612).

Keywords: Android; Activity; Intent; HelloWorld Application; xml; Kernel.

Program 1.1

C program to convert the upper case letter to lower case letter

```
#include<stdio.h>
main()
{
char ch = 'A';
char b = tolower(ch);
printf("upper case letter %c is converted to lower case letter %c", ch, b);
}
```

Output on the screen:

upper case letter A is converted to lower case letter a

If you want to enter the character through the keyboard, then the above program should take the form:

```
#include<stdio.h>
main()
{
char ch;
printf("Enter any character:");
scanf("%c", &ch);
char b = tolower(ch);
printf("upper case letter %c is converted to lower case letter %c", ch, b);
}
```

Output on the screen:

Enter any character:

If you enter the character C

upper case letter C is converted to lower case letter c will be outputted on the screen.

Program 1.2

C program to convert the lower case letter to upper case letter

```
#include<stdio.h>
main()
{
char ch = 'a';
```

```
char b = toupper(ch);
printf("lower case letter %c is converted to upper case letter %c", ch, b);
}
```

Output on the screen:

lower case letter a is converted to upper case letter A
If you want to enter the character through the keyboard, then the above program should take the form:

```
#include<stdio.h>
main()
{
char ch;
printf("Enter any character:");
scanf("%c", &ch);
char b = toupper(ch);
printf("lower case letter %c is converted to upper case letter %c", ch, b);
}
```

Output on the screen:

Enter any character:

If you enter the character h

lower case letter h is converted to upper case letter H will be outputted on the screen.

Program 1.3

C program to test whether the entered character is upper case letter or not

```
#include<stdio.h>
main()
{
char ch = 'a';
if(isupper(ch))
printf("you have entered the upper case letter");
else
printf("you have entered the lower case letter");
}
```

Output on the screen:

you have entered the lower case letter

If the statement `char ch = 'a';` is replaced by the statement `char ch = 'A';`
i.e., if the above program is rewritten as:

```
#include<stdio.h>
main()
{
char ch = 'A';
if(isupper(ch))
printf("you have entered the upper case letter");
else
printf("you have entered the lower case letter");
}
```

Then the output on the screen is:
you have entered the upper case letter

Program 1.3

C program to test whether the entered character is lower case letter or not

```
#include<stdio.h>
main()
{
char ch = 'a';
if(islower(ch))
printf("you have entered the lower case letter");
else
printf("you have entered the upper case letter");
}
```

Output on the screen:
you have entered the lower case letter

Program 1.4

C program to print the value of tan inverse x (i.e., the value of $\tan^{-1}x$)

```
#include<stdio.h>
#include<math.h>
main()
{
int x = 20;
printf("the value of tan inverse x = %f", atan(x));
}
```

Output on the screen:
the value of tan inverse x = 1.520838

Program 1.5

C program to print the value of tan inverse x/y (i.e., the value of $\tan^{-1}x/y$)

```
#include<stdio.h>
#include<math.h>
main()
{
int x,y;
x = 20;
y = 20;
printf("the value of tan inverse x/y = %f", atan2(x,y));
}
```

Output on the screen:

the value of tan inverse x/y = 0.785398
"Linux is evolution, not intelligent design."
— Linus Torvalds

Program 1.6

C program to print the value of `fmod(x, y)`

```
#include<stdio.h>
#include<math.h>
main()
{
float x = 20.500000;
float y = 20.799999;
printf("the remainder of %f divided by %f is %f", x, y, fmod(x,y));
}
```

Output on the screen:

the remainder of 20.500000 divided by 20.799999 is
20.500000

Program 1.6

C program to print the value of `~x`

```
#include<stdio.h>
main()
{
int x, y;
x = 205;
y = ~x;
printf("the value of y is:%d", y);
}
```

Output on the screen:

the value of y is:-206

If the statement `y = ~x;` is replaced by the statement `y =`

`-(~x);`

i.e., if the above program is rewritten as:

```
#include<stdio.h>
main()
{
int x, y;
x = 205;
y = -(~x);
printf("the value of y is:%d", y);
}
```

Then the output on the screen is:

the value of y is:206

Program 1.7

C program to print the ASCII (American Standard Code for Information Interchange) value of the entered character

```
#include<stdio.h>
main()
{
char ch = 'A';
printf("the ASCII value of ch is: %d", ch);
}
```

Output on the screen:

the ASCII value of ch is: 65

If the statement `printf("the ASCII value of ch is: %d", ch);` is replaced by the statement

`printf("the ASCII value of ch is: %c", ch);`

i.e., if the above program is rewritten as:

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

```
main()
```

```
{
char ch='A';
printf("the ASCII value of ch is: %c", ch);
}
```

Then the output on the screen is:

the ASCII value of ch is: A

What will be the output of the following programs:

(a)

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

```
main()
```

```
{
int i;
int num [5] = {16,18,19,20,21};
for(i=0;i<5;i++)
printf("\n Element = %d", num[i] +1);
}
```

Answer:

```
Element = 17
Element = 19
Element = 20
Element = 21
Element = 22
```

(b)

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

```
main()
```

```
{
int i = 54;
int y = i<<1;
printf("The value of y = %d", y);
}
```

Answer:

The value of y = 108

If the statement `i<<1` is replaced by the statement `i<<2`

Then the output on the screen is:

The value of y = 216

i.e.,

`i<<1` implies $54 * 2 = 108$

`i<<2` implies $54 * 4 = 216$

`i<<3` implies $54 * 6 = 324$

`i<<4` implies $54 * 8 = 432$

(c)

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

```
main()
```

```
{
int i = 54;
```

```
int y = i>>1;
printf("The value of y = %d", y);
}
```

Answer:

The value of y = 27

If the statement `i>>1` is replaced by the statement `i>>2`

Then the output on the screen is:

The value of y = 13

i.e.,

`i>>1` implies $54 / 2 = 27$

`i>>2` implies $54 / 4 = 13$

`i>>3` implies $54 / 6 = 9$

`i>>4` implies $54 / 8 = 6$

Note: `<<` implies left shift operator and `>>` implies right shift operator

Program 1.8

C program to print the length of the entered character (i.e., to print the length of the string)

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

```
#include<string.h>
```

```
main()
```

```
{
char ch[4];
printf("Enter any word: ");
scanf("%c", &ch);
printf("The length of the string = %d", strlen(ch));
}
```

Output on the screen:

Enter any word:

If you enter the word dog

The length of the string = 3 will be displayed on the console screen because there are three letters in the word dog.

Suppose if you enter the word tech

The length of the string = 4 will be displayed on the console screen because there are four letters in the word tech.

Program 1.9

C program to print the factorial of the entered number

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

```
main()
```

```
{
int i, n, fact=1 ;
printf("Enter any number:");
scanf("%d", &n);
for(i=1; i<=n; i++)
fact = fact *i;
printf("\n Entered number is: %d", n);
printf("\n The factorial of the entered number %d is: %d", n, fact);
}
```

Output on the screen:

Enter any number:

If you enter the number 2

Entered number is: 2

The factorial of the entered number 2 is: 2 will be displayed on the screen.
 Suppose if you enter the number 4
 Entered number is: 4
 The factorial of the entered number 4 is: 24 ($4 \times 3 \times 2 \times 1$) will be displayed on the screen.

C ++

Program 2.0

C++ program to convert the upper case letter to lower case letter

```
#include<iostream>
using namespace std;
main()
{
char ch = 'A';
char b = tolower(ch);
cout<<"upper case letter" << ch << "is converted to
lower case letter"<< b;
}
```

Output on the screen:

upper case letter A is converted to lower case letter a
 If you want to supply the value of ch through the keyboard, then the above take the form:

```
#include<iostream>
using namespace std;
main()
{
char ch;
cout<<"Enter any character:"<<endl;
cin>>ch;
char b = toupper(ch);
cout<<"lower case letter"<< ch << "is converted to
upper case letter"<< b;
}
```

Output on the screen:

Enter any character:

If you enter the character C

upper case letter C is converted to lower case letter c
 will be outputted on the screen.

Program 2.1

C ++ program to convert the lower case letter to upper case letter

```
#include<iostream>
using namespace std;
main()
{
char ch = 'a';
char b = toupper(ch);
cout<<"lower case letter"<< ch << "is converted to
upper case letter"<< b;
}
```

Output on the screen:

lower case letter a is converted to upper case letter A

Program 2.2

C++ program to test whether the entered character is upper case letter or not

```
#include<iostream>
using namespace std;
main()
{
char ch = 'a';
if(isupper(ch))
cout<<"you have entered the upper case letter";
else
cout<<"you have entered the lower case letter";
}
```

Output on the screen:

you have entered the lower case letter

If the statement char ch = 'a'; is replaced by the statement char ch = 'A';

i.e., if the above program is rewritten as:

```
#include<iostream>
using namespace std;
main()
{
char ch = 'A';
if(isupper(ch))
cout<<"you have entered the upper case letter";
else
cout<<"you have entered the lower case letter";
}
```

Then the output on the screen is:

you have entered the upper case letter

Program 2.3

C++ program to test whether the entered character is lower case letter or not

```
#include<iostream>
using namespace std;
main()
{
char ch = 'a';
if(islower(ch))
cout<<"you have entered the lower case letter";
else
cout<<"you have entered the upper case letter";
}
```

Output on the screen:

you have entered the lower case letter

Program 2.4

C++ program to print the value of tan inverse x (i.e., the value of $\tan^{-1}x$)

```
#include<iostream>
#include<cmath>
using namespace std;
main()
{
int x = 20;
```

```
cout<<"the value of tan inverse x = "<< atan(x);
}
```

Output on the screen:

the value of tan inverse x = 1.520838

Program 2.5

C++ program to print the value of tan inverse x/y (i.e., the value of $\tan^{-1}x/y$)

```
#include<iostream>
#include<cmath>
using namespace std;
main()
{
int x,y;
x = 20;
y=20;
cout<<"the value of tan inverse x/y = " << atan2(x,y);
}
```

Output on the screen:

the value of tan inverse x/y = 0.785398

Program 2.6

C++ program to print the value of fmod(x, y)

```
#include<iostream>
#include<cmath>
using namespace std;
main()
{
float x = 20.500000;
float y =20.799999;
cout<<"the remainder of"<< x<< "divided by" << y<<
" is: " << fmod(x,y);
}
```

Output on the screen:

the remainder of 20.500000 divided by 20.799999 is
20.500000

Program 2.7

C++ program to print the value of $\sim x$

```
#include<iostream>
using namespace std;
main()
{
int x, y;
x = 205;
y= $\sim$ x;
cout<< "the value of y is: " << y;
}
```

Output on the screen:

the value of y is:-206

If the statement $y= \sim x$; is replaced by the statement $y= \sim (\sim x)$;

i.e., if the above program is rewritten as:

```
#include<iostream>
using namespace std;
main()
{
```

```
int x, y;
x = 205;
y= $\sim$ ( $\sim$ x);
cout<< "the value of y is: " << y;
}
```

Then the output on the screen is:

the value of y is:206

Program 2.8

C++ program to print the ASCII (American Standard Code for Information Interchange) value of the entered character

```
#include<iostream>
using namespace std;
main()
{
char ch ='A';
cout<<"the ASCII value of ch is: "<< ( int) ch;
}
```

Output on the screen:

the ASCII value of ch is: 65

If the statement $\text{cout}<<\text{"the ASCII value of ch is: "}<< (\text{int}) \text{ch}$; is replaced by the statement

$\text{cout}<<\text{"the ASCII value of ch is: "}<< (\text{char}) \text{ch}$;

Then the output on the screen is:

the ASCII value of ch is: A

What will be the output of the following programs:

(a)

```
#include<iostream>
using namespace std;
main()
{
int i;
int num [5] = {16,18,19,20,21};
for(i=0;i<5;i++)
cout<< "\n Element = " << num[i] +1;
}
```

Answer:

Element = 17
Element = 19
Element = 20
Element = 21
Element = 22

(b)

```
#include<iostream>
using namespace std;
main()
{
int i = 54;
int y = i<<1;
cout<< "The value of y = " << y;
}
```

Answer:

The value of $y = 108$

If the statement $i \ll 1$ is replaced by the statement $i \ll 2$
Then the output on the screen is:

The value of $y = 216$

i.e.,

$i \ll 1$ implies $54 * 2 = 108$

$i \ll 2$ implies $54 * 4 = 216$

$i \ll 3$ implies $54 * 6 = 324$

$i \ll 4$ implies $54 * 8 = 432$

(c)

```
#include<iostream>
using namespace std;
main()
{
int i = 54;
int y = i >> 1;
cout << "The value of y = " << y;
}
```

Answer:

The value of $y = 27$

If the statement $i >> 1$ is replaced by the statement $i >> 2$
Then the output on the screen is:

The value of $y = 13$

i.e.,

$i >> 1$ implies $54 / 2 = 27$

$i >> 2$ implies $54 / 4 = 13$

$i >> 3$ implies $54 / 6 = 9$

$i >> 4$ implies $54 / 8 = 6$

Note: \ll implies left shift operator and \gg implies right shift operator

Program 2.9

C++ program to print the length of the entered character (i.e., to print the length of the string)

```
#include<iostream>
#include<cstring>
using namespace std;
main()
{
char ch[4];
cout << "Enter any word: ";
cin >> ch;
cout << "The length of the string = " << strlen(ch);
}
```

Output on the screen:

Enter any word:

If you enter the word dog

The length of the string = 3 will be displayed on the console screen because there are three letters in the word dog.

Suppose if you enter the word tech

The length of the string = 4 will be displayed on the console screen because there are four letters in the word tech.

Program 3.0

C++ program to print the factorial of the entered number

```
#include<iostream>
using namespace std;
main()
{
int i, n, fact=1;
cout << "Enter any number: ";
cin >> n;
for(i=1; i <= n; i++)
fact = fact * i;
cout << "Entered number is: " << n << endl;
cout << "The factorial of the entered number" << n << "
is:" << fact;
}
```

Output on the screen:

Enter any number:

If you enter the number 2

Entered number is: 2

The factorial of the entered number 2 is: 2 will be displayed on the screen.

Suppose if you enter the number 4

Entered number is: 4

The factorial of the entered number 4 is: 24 ($4 \times 3 \times 2 \times 1$) will be displayed on the screen.

Java

Program 3.1

Java program to test whether the entered character is a digit or not

```
public class HelloWorld {
public static void main (String []args) {
if(Character.isDigit('5'))
System.out.println("the entered character is a digit");
else
System.out.println("the entered character is not a digit");
}
}
```

Output on the screen:

the entered character is a digit

If you want to supply the value of digit through the keyboard then the above program should be rewritten as:

```
public class HelloWorld {
public static void main (String []args) throws
Exception {
int ch;
System.out.print("Enter a digit:");
ch = (int)System.in.read();
if(Character.isDigit(ch))
System.out.println("the entered character is a digit");
else
System.out.println("the entered character is not a digit");
}
```

```
}
}
```

Output on the screen:

Enter a digit:

If you enter the digit 5

the entered character is a digit will be outputted on the screen.

Note:

- If the statement throws Exception is omitted from the statement

public static void main (String []args)throws Exception
Then the compilation error will be displayed on the screen.

- If the statement if(Character.isDigit('5')) is replaced by the statement
if(Character.isDigit(5))

Then the output on the screen is:

the entered character is not a digit

Note:

The above program can also be written as:

(A)

```
import java.util.Scanner;
public class HelloWorld{
public static void main (String []args)throws
Exception{
int ch;
Scanner scan = new Scanner(System.in);
System.out.print("Enter a digit:");
ch = scan.nextInt();
if(Character.isDigit(ch))
System.out.println("the entered character is a digit");
else
System.out.println("the entered character is not a
digit");
}
}
```

(B)

```
import java.util.Scanner;
public class HelloWorld{
public static void main (String []args)throws
Exception{
int ch;
Scanner in = new Scanner(System.in);
System.out.print("Enter a digit:");
ch = in.nextInt();
if(Character.isDigit(ch))
System.out.println("the entered character is a digit");
else
System.out.println("the entered character is not a
digit");
}
```

```
}
}
```

Program 3.2

Java program to test whether the entered character is a letter or not

```
public class HelloWorld{
public static void main (String []args){
if(Character.isLetter('A'))
System.out.println("the entered character is a letter");
else
System.out.println("the entered character is not a
letter");
}
}
```

Output on the screen:

the entered character is a letter

Program 3.3

Java program to print the value of atan(x)

```
public class HelloWorld{
public static void main (String []args){
int x = 20;
System.out.println("the value of tan inverse x = "+
Math.atan(x));
}
}
```

Output on the screen:

the value of tan inverse x = 1.520838

Program 3.4

Java program to print the value of tan inverse x/y (i.e., the value of $\tan^{-1}x/y$)

```
public class HelloWorld{
public static void main (String []args){
int x = 20;
int y=20;
System.out.println("the value of tan inverse x/y = "+
Math.atan2(x,y));
}
}
```

Output on the screen:

the value of tan inverse x/y = 0.785398

Program 3.5

Java program to print the output

```
Element = 17
Element = 19
Element = 20
Element = 21
Element = 22
```

```
public class HelloWorld{
public static void main (String []args){
int i;
int [] num = {16,18,19,20,21};
for(i=0; i<5; i++)
```



```
System.out.println("\n Element = " + (num[i] +1));
}
}
```

Output on the screen:

```
Element = 17
Element = 19
Element = 20
Element = 21
Element = 22
```

Note: if the statement

```
System.out.println("\n Element = " + num[i] +1);
```

is written instead of the statement

```
System.out.println("\n Element = " + (num[i] +1));
```

Then the output on the screen is:

```
Element = 161
Element = 181
Element = 191
Element = 201
Element = 211
```

What will be the output of the following programs:

(a)

```
public class HelloWorld{
public static void main (String []args){
int i = 54;
int y = i >>1;
System.out.println("value of y = " + y);
}
}
```

(b)

```
public class HelloWorld{
public static void main (String []args){
int i = 54;
int y = i <<1;
System.out.println("value of y = " + y);
}
}
```

Program 3.6

Java program to print the ASCII (American Standard Code for Information Interchange) value of the entered character

```
public class HelloWorld{
public static void main (String []args){
char ch ='A';
System.out.println("the ASCII value of ch is: " + (int)
ch);
}
}
```

Output on the screen:

```
the ASCII value of ch is: 65
```

If the statement `System.out.println("the ASCII value of ch is: " + (int) ch);` is replaced by the statement

```
System.out.println("the ASCII value of ch is: " + (
char) ch);
```

Then the output on the screen is:

```
the ASCII value of ch is: A
```

Program 3.7

Java program to print the value of $\sim x$

```
public class HelloWorld{
public static void main (String [] args){
int x, y;
x = 205;
y=~x;
System.out.println("the value of y is: " + y);
}
}
```

Output on the screen:

```
the value of y is:-206
```

If the statement `y=~x;` is replaced by the statement `y= - (~x);`

i.e., if the above program is rewritten as:

```
public class HelloWorld{
public static void main (String [] args){
int x, y;
x = 205;
y= -(~x);
System.out.println("the value of y is: " + y);
}
}
```

Then the output on the screen is:

```
the value of y is:206
```

Program 3.7

Java program to print the length of the entered character (i.e., to print the length of the string)

A)

```
public class HelloWorld{
public static void main (String [] args){
String m = new String ("computer");
System.out.println("length of string = " + m.length());
}
}
```

Output on the screen:

```
length of string = 8
```

B)

```
import java.util.Scanner;
public class HelloWorld {
public static void main(String [] args) {
String m;
Scanner in = new Scanner(System.in);
System.out.print("Enter the word: ");
m = in.nextLine();
System.out.println(" the word you entered = " + m);
System.out.println("length of string = " + m.length());
}
```



```

}
Enter the word: file
the word you entered = file
length of string = 4

```

Program 3.8

```

Java program to display the date
import java.util.Date;
public class HelloWorld {
public static void main(String args[]) {
Date date = new Date();
System.out.println(date.toString());
}
}

```

Output on the screen:

```

Mon Feb 15 10:49:33 EST 2016

```

What will be the output of the following program:

```

import java.util.Scanner;
public class HelloWorld {
public static void main(String args[]) {
int i, n, fact=1 ;
Scanner scan = new Scanner(System.in);
System.out.println("Enter any number: ");
n= scan.nextInt();
for(i=1; i<=n; i++)
fact = fact *i;
System.out.println("\n Entered number is: " + n);
System.out.println("\n The factorial of the entered
number" + n + " is:" + fact);
}
}

```

Program 3.8

Java program to check whether the two numbers are equivalent or not using equals() method

```

public class HelloWorld {
public static void main(String [] args) {
Integer x =5;
Integer y= 6;
if(x.equals(y))
System.out.println("x equals y ");
else
System.out.println("x does not equals y ");
}
}

```

Output on the screen:

```

x does not equals y

```

Program 3.9

Java program to print the reverse of the entered word

```

public class HelloWorld {
public static void main (String [] args){
String m = new String ("computer");
System.out.println("length of string = " + m.length());

```

```

System.out.println(" the word you entered = " + m);
String l = new StringBuffer(m).reverse().toString();
System.out.println("reverse of the entered word:" + l);
}
}

```

Output on the screen:

```

length of string = 8
the word you entered = computer
reverse of the entered word: retupmoc

```

If you want to enter the word through the keyboard, then the above program should take the form:

```

import java.util.Scanner;
public class HelloWorld {
public static void main(String [] args) {
String m;
Scanner in = new Scanner(System.in);
System.out.print("Enter the word: ");
m = in.nextLine();
System.out.println(" the word you entered = " + m);
String l = new StringBuffer(m).reverse().toString();
System.out.println("reverse of the entered word:" + l);
}
}

```

Output on the screen:

```

Enter the word:
If you enter the word computer
the word you entered = computer
reverse of the entered word: retupmoc
will be displayed on the screen.

```

Program 4.0

Java program to insert the word

```

public class HelloWorld {
public static void main (String [] args){
String m = new String ("computer");
System.out.println(" the word you entered = " + m);
String l = new StringBuffer(m).insert(3, "bill
gates").toString();
System.out.println("the word computer after addition
of another word bill gates appear as : " + l);
}
}

```

Output on the screen:

```

the word you entered = computer
the word computer after addition of another word bill
gates appear as : combill gatesputer

```

If you want to enter the word through the keyboard, then the above program should take the form:

```

import java.util.Scanner;
public class HelloWorld {
public static void main (String [] args){
String m;
Scanner in = new Scanner(System.in);
System.out.print("Enter the word: ");
m = in.nextLine();
System.out.println(" the word you entered = " + m);

```

```
String l = new StringBuffer(m).insert(3, "bill
gates").toString();
System.out.println("the entered word after addition of
another word bill gates appear as : " + l);
}
}
```

Output on the screen:

Enter the word:

If you enter the word steve jobs

the word you entered = steve jobs

the entered word after addition of another word bill
gates appear as :stebill gatesve jobs
will be outputted on the screen.

Note:

(a)

```
import java.util.Scanner;
public class HelloWorld{
public static void main (String [] args){
String m;
Scanner scan = new Scanner(System.in);
System.out.print("Enter the word: ");
m = scan.nextLine();
System.out.println(" the word you entered = " + m);
String l = new StringBuffer(m).insert(3, "bill
gates").toString();
System.out.println("the entered word after addition of
another word bill gates appear as : " + l);
}
}
```

(b)

```
import java.util.Scanner;
public class HelloWorld{
public static void main (String [] args){
String m;
Scanner yavon = new Scanner(System.in);
System.out.print("Enter the word: ");
m = yavon.nextLine();
System.out.println(" the word you entered = " + m);
String l = new StringBuffer(m).insert(3, "bill
gates").toString();
System.out.println("the entered word after addition of
another word bill gates appear as : " + l);
}
}
```

Output on the screen:

Enter the word:

If you enter the word steve jobs

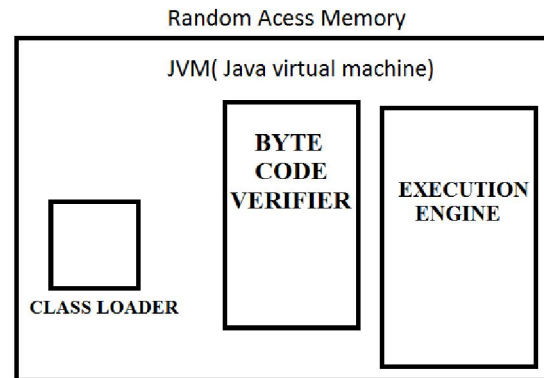
the word you entered = steve jobs

the entered word after addition of another word bill
gates appear as :stebill gatesve jobs
will be outputted on the screen.

Note 1:

The statement `public static void main(String args[])` can also be written as:
`static public void main(String [] args)`

Note 2:



JVM (Java Virtual Machine) resides under RAM (Random Access Memory – the stuff that boost up your computer to run faster and allows your computer to perform many tasks at the same time) and it comprises **CLASS LOADER**: it loads .class file that contains Java byte codes.

BYTE CODE VERIFIER: it verifies byte codes.

EXECUTION ENGINE: it translates java byte codes to machine codes and executes them.

ANDROID

Linux based operating system which powers millions of mobile devices such as smartphones and tablet computers across the world – first developed by Android Inc. and later further advanced by open hand set alliance (a group of 84 technology and mobile companies such as Dell, Motorola, Samsung Electronics, Sony, Intel, LG Electronics etc.) – led by Google Inc. and was initially released in September 23, 2008.

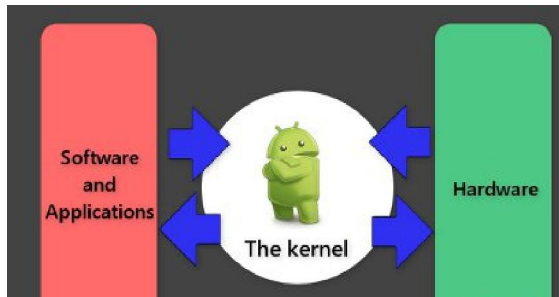
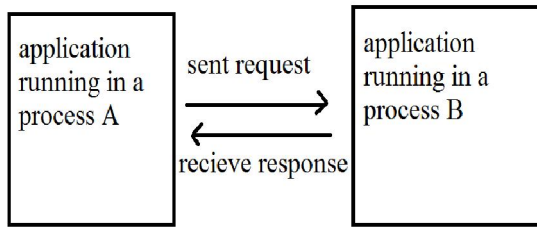
Android Architecture

- **LINUS KERNEL**

Core part / heart of the android operating system – developed by Linus Torvalds in 1991 – which consists of drivers (i.e., a well-defined set of instructions – what we call programs or software written in C language that is installed into mobile phones and stored in the form of files in the phone) – that tells your mobile phone how to communicate with its hardware components such as camera, display etc. – without which keypad, Bluetooth, Audio, Wi-Fi, Camera won't work properly and it is responsible for Inter Process Communication (IPC: a mechanism which allows applications running in different processes to share data and communicate with each other i.e., a mechanism which allows an application running in a process to send requests and receive responses from an application running in another process), Power management (conserves power

in the expense of performance and holds the device not to get to sleep state) and Memory management (make the best or most effective use of memory).

Inter Process Communication



Intercommunication of software and applications with hardware through Kernel

• LIBRARIES

A collection of prewritten non-volatile data (written in C/ C++ language) and precompiled programming codes – which support the well-functioning of android operating system.

Libraries include:

- ❖ Surface Manager/ Screen manager (support the display screen)
- ❖ OpenGL (Open Graphics Library) – support 3Dimensional graphics
- ❖ SGL (Scalable Graphics Library) – support 2Dimensional graphics
- ❖ Media Framework – support recording and playback of audio and video and image formats (MP3, JPG, JPEG, PNG, GIF etc.)
 - ❖ Free Type – responsible for font support (i.e., font size, color etc.)
 - ❖ SSL (Secured Sockets layer) / TLS (Transport Layer Security) – responsible for internet security and support network applications
 - ❖ WebKit – support the display of web pages (i.e., support inbuilt browser)
 - ❖ SQLite – responsible for storage of user data

- ❖ Bionic – standard C library WHICH supports embedded Linux based devices in mobile phones



Android Run Time (ART)

This includes Java core libraries (consists of Java packages) and DVM (Dalvik Virtual Machine) – which is responsible to run android application.

Note 1:

Java source code is compiled into Java bytecode which is stored within .class file and the Java bytecode is read, verified and executed by Java Virtual Machine (JVM). But in the case of Google's Android operating system, DVM (Dalvik Virtual Machine) is used instead of JVM because JVM is designed for desktops and it is too heavy for mobile devices and moreover JVM takes more memory, runs and loads slower compared to DVM.

In case of desktop operating system,

Java source codes – are compiled to – Java byte codes (which then stored in .class file) – read, verified and executed by JVM.

In case of Google's Android operating system,

Java source codes – are compiled to – Java byte codes (which then stored in .class file) – a tool called dx then converts Java byte codes into Dalvik byte codes (which are then stored in .dex file i.e., in . Dalvik Executable file) – and are read, verified and executed by DVM (Dalvik Virtual Machine – open-source software meaning a software which is freely available to the public – developed by Dan Bornstein, who named it after the fishing village of Dalvik in Iceland).

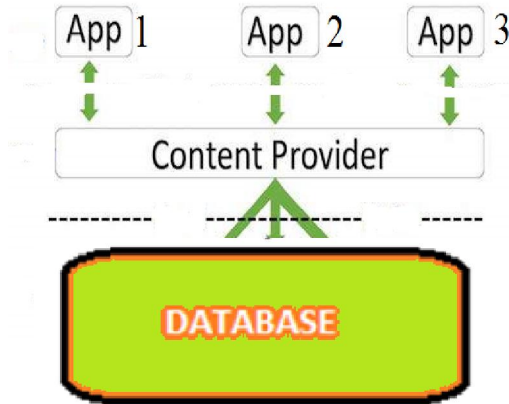
Application Frame Work

A software frame work (written in Java language) that supports the features of android applications Application Frame Work includes:

- Content Provider
- Notifications Manager
- Activity Manager
- Window Manager
- Location Manager
- View manager
- Package manager
- Telephony manager

- XMPP (Extensible Messaging and Presence Protocol)
- Resource manager:

Content Provider



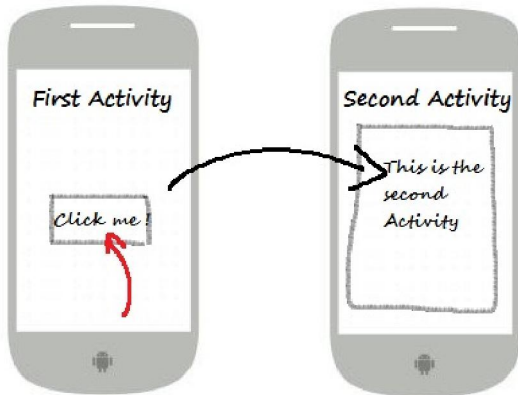
Data of applications (App 1, App 2 & App 3) are stored in database (which may be SQLite or Files etc.). If application App 1 requests content provider for the data of the application App 2, then the content provider fetches the data of the application App 2 and sends to App 1. Thus the data of App 2 is shared by App 1 THROUGH Content provider.

“Content provider allows the sharing of data among various applications.”

Notifications Manager

Notifications Manager – display alerts and notifications (like low battery, you have got 2 messages, you have 2 missed calls etc.) to the user.

Activity Manager



If you open your mailbox application, you see number of activities such as inbox, sent, draft etc.

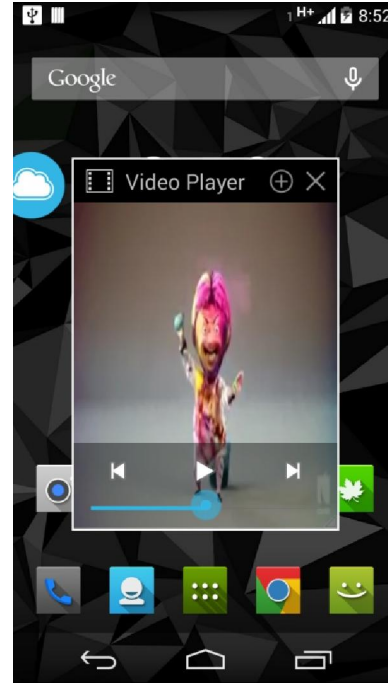
If you click on inbox, then another activity showing the list of inbox mails is opened.

And if you click on one of the inbox mail, then another activity showing the content of inbox mail is opened.

The activity manager manages and keeps the record of these activities.

Window Manager

Window Manager organizes the display screen for the application



the display screen for the video player application organized by Window Manager

Location Manager

Location Manager provides the periodic updates of the geographical location of the mobile device using GPS (Global Positioning System which is a satellite-based navigation system) or cell tower.

View manager



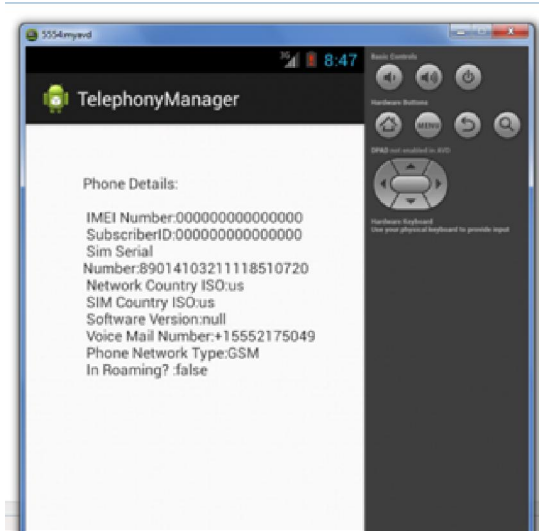
View manager manages the apps user interface.

Package manager

Package manager provide information about the list of installed apps in Android mobile device.

Telephony manager

Telephony manager provide information about the Telephony services (such as phone network, sim serial number, IMEI number etc.).



Facebook



Instagram



LinkedIn

What will be the output of the following program:

```
public class HelloWorld {
    public static void main (String [] args) {
        String m = new String ("Strings are immutable");
        System.out.println(m.charAt(8));
    }
}
```

Answer:

Output on the screen:

a

Note: if you replace the statement
System.out.println(m.charAt(8));
by the statement

```
System.out.println("m.charAt(8)");
```

Then the output on the screen is:

m.charAt(8)

If you want to enter the sentence through the keyboard, then the above program should take the form:

```
import java.util.Scanner;
public class HelloWorld {
    public static void main(String [] args) {
        String m;
        Scanner in = new Scanner(System.in);
        System.out.print("Enter the sentence: ");
        m = in.nextLine();
        System.out.println(m.charAt(8));
    }
}
```

Output on the screen:

Enter the sentence: strings are immutable

a

will be displayed on the screen.

Android - Application Components

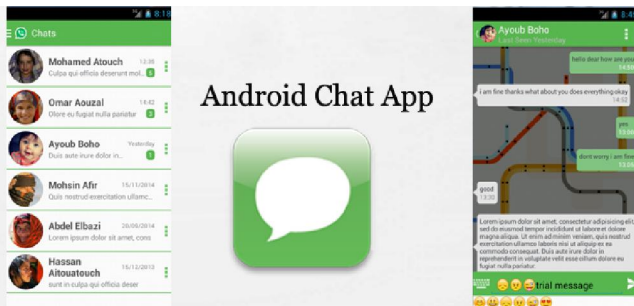
Which are the building blocks of android application.

The main components of the android application are:

- Activities
- Services

XMPP

XMPP (Extensible Messaging and Presence Protocol) supports online chat application (like yahoo messenger etc.).



Resource manager

Where you can store all the non-code resources like images, graphics, videos, audios, animations, pictures that your application might use as backgrounds etc. – and you can upload these resources to your app.

Applications

Which include: contacts, browser, messages, facebook, whatsapp etc.



Twitter

- Broadcast Receivers
- Content Providers
- Intent
- View
- Android Virtual Device (AVD)
- Android Emulator

Activities

If you open your phone application, you see number of activities such as received calls, dialed calls, missed calls etc.

If you click on received calls, then another activity (i.e., screen showing the list of received calls) is opened.

And if you click on one of the received call, then another activity showing the information about the received call (such as the phone number of received call, the time at which it was received etc.) is opened. And if you want to make a call, another activity showing the number keypad is opened.

Services

If you want the music to play in the background or if you want some video to be downloaded while you are browsing over the internet – services provide feasibility for the music to play in the background or video to be downloaded while you are browsing over internet.

Broadcast Receivers

pop up notifications such as low battery, charging, Power got connected to the mobile device, Power got disconnected from the mobile device, A headset was plugged in, A headset was plugged out.



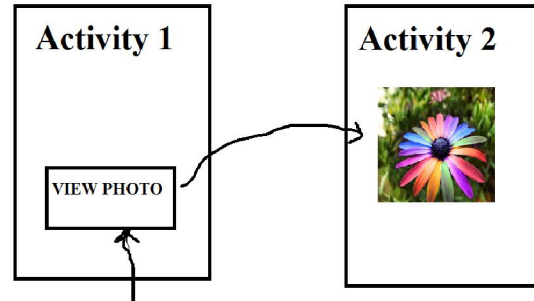
Content Providers

If you type a request for the meaning of a word in the search engine of user dictionary application

User dictionary application sends the request to content resolver and the content resolver sends the request to the content provider and the content provider fetches the information from the database and directs it

to the content provider and then from content provider to content resolver and finally from content resolver to user application.

Intent



When you press view photo, intent (message) is sent to the android operating system to open another activity (i.e., activity 2) which display the photo

View (apps user interface)

Android Virtual Device (AVD) & Emulator

Different android mobile devices possess different configurations. After running and testing your android application on emulator (the component that allows the testing of android application without the necessity to install the application on a physical Android based mobile device) you need Android Virtual Device (AVD) to test whether the application is compatible with a particular android mobile device configuration before installation of the app into that mobile device.

XML

EXtensible (extendable) Markup (symbols and notations like <, >, / etc.) Language (which is both human and machine understandable language) is a simple and very flexible text format designed to store data and transport data through internet.

HTML (Hyper Text Markup Language) = A text format designed to display data

1. XML to display the output:

```

note
to people
from steve jobs
message Design is not just what it looks like and feels like. Design is how it works.
Answer:
<note>
<to> people </to>
<from> steve jobs </from>
<message> Design is not just what it looks like and feels like. Design is how it works. </message>
</note>

```

Note:

If the statement

<message> Design is not just what it looks like and feels like. Design is how it works. </message>

is replaced by the statement

<Message> Design is not just what it looks like and feels like. Design is how it works. </message>

Then there will be no display of the output on the console screen.

The statement <to> people </to> imply element <to> imply start tag and </to> imply end tag

<note>

.....
.....
.....

</note> is termed parent element

And

<to> people </to>

<from> steve jobs </from>

<message> Design is not just what it looks like and feels like. Design is how it works. </message> are termed child elements

2. XML to display the output:

Book

Name of the book: Harry Potter

Author: J K. Rowling

Price: 255\$

Pages: 296

Year: 2002

Edition: 8

Answer:

<Book>

<Name>:Harry Potter </Name>

<Author>: J K. Rowling </Author>

<Price>: 255\$ </Price>

<Pages>: 296 </Pages>

<Year>: 2002</Year>

<Edition>: 8 </Edition>

</Book>

Note:

What will be the output of the following:

<Book>

<Name>: Harry Potter </Name>

<Author> J K. Rowling </Author>

<Price> 255\$ </Price>

<rowling> <Pages> 296 </Pages></rowling>

<Year> 2002</Year>

<Edition> 8 </Edition>

</Book>

Note 1:

<rowling> <Pages> 296 </Pages></rowling> is termed child element and <Pages> 296 </Pages> is termed sub child element.

“I think right now it's a battle for the mindshare of developers and for the mindshare of customers, and right now iPhone and Android are winning that battle.”

-- Steve Jobs

How to create an android application which says Hello Android

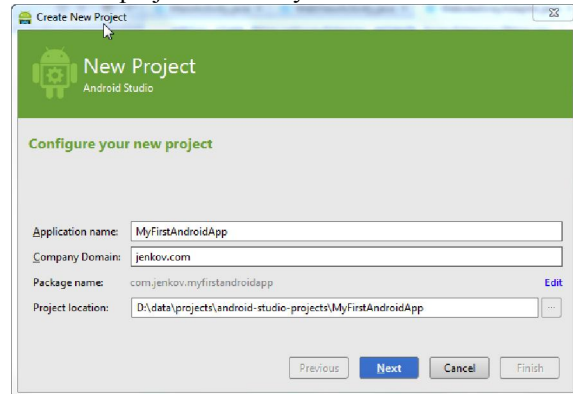
First you have to download android studio from the website

<http://developer.android.com/sdk/index.html>

And after downloading and installing it into your computer, you need to follow the option

File → New → New project

And Create New Project window is opened and in create new project window you will see



Application name:

Company domain:

Package name:

Project location:

Application name: name of the application you are going to create

Because you are going to create Hello Android app,

Application name is Hello Android

Company domain: domain name which you prefer to be associated with your app to preserve its unique identity in Google play store —without which you cannot generate a package name and without the package name you cannot distribute your app in android market like Google play store.

In this case we just name the

Company domain as manju.example.com

Package name:

Since Company domain is manju.example.com and application name is Hello Android

Package name is:

com. example. manju. helloandroid

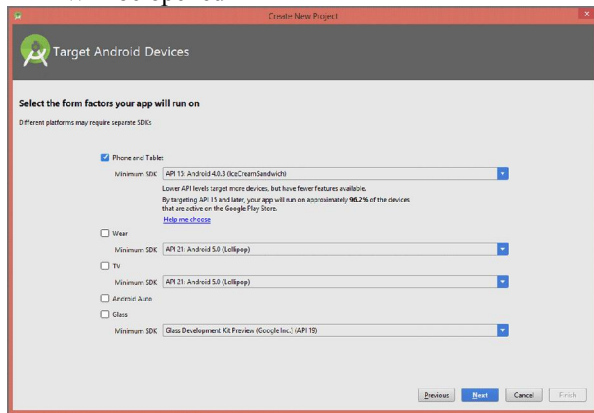
Project location: a file or folder on your hard drive where the newly created application will be stored.

In this case the above app will be stored in
C:\Users\Manju\AndroidStudioProjects\HelloAndroid2

Application name: Hello Android
Company domain: manju.example.com
Package name: com.example.manju.helloandroid
Project location:
C:\Users\Manju\AndroidStudioProjects\HelloAndroid2

Once you have set the application name, company domain and project location, click on the "Next" button in the lower right corner of the Create New Project window.

And then a window
Target Android devices
Will be opened



Because we wish to install our app to phones and smart phone tablets we select Phones and Tablets

And under Phones and Tablets – we see minimum SDK

Selection of minimum SDK is very important because

If you select minimum SDK (SDK means software development kit):

API3: Android 1.5(Cupcake)

Then your app will run on approximately 100% of the mobile devices that are active on the Google play store.

Suppose if you select minimum SDK:

API16: Android 4.1 (Jelly Bean)

Then your app will run on approximately 94.8% of the mobile devices that are active on the Google play store.

After selecting the minimum SDK click on the "Next" button in the lower right corner of the Target Android devices window.

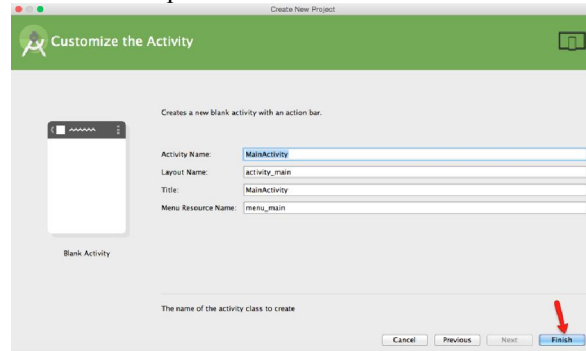


And then a window
Add an activity to mobile
Will be opened

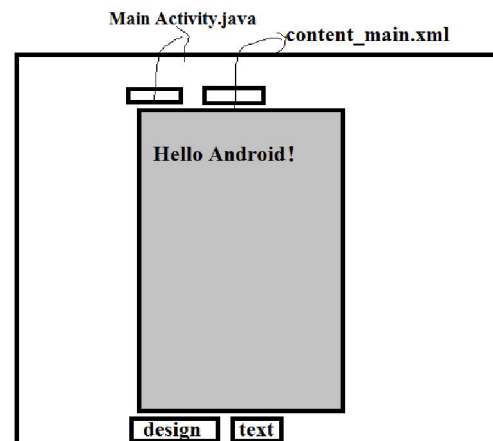
And you need to select an activity and click on the "Next" button in the lower right corner of the Add an activity to mobile window.

In this case, we select blank activity

And then a window
Customize the activity
Will be opened



Click on the finish button and a new window



Will be opened displaying the text Hello Android
If you click on text button then 2 files

- Main Activity.java
- content_main.xml

will be displayed on the screen.
And in content_main.xml file
You see

```
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Hello Android!" />
```

If you replace the statement

```
    android:text="Hello Android!"
```

by the statement

```
    android:text="Hello World!"
```

Then instead of Hello Android!

 Hello World!

Will be displayed on the screen.

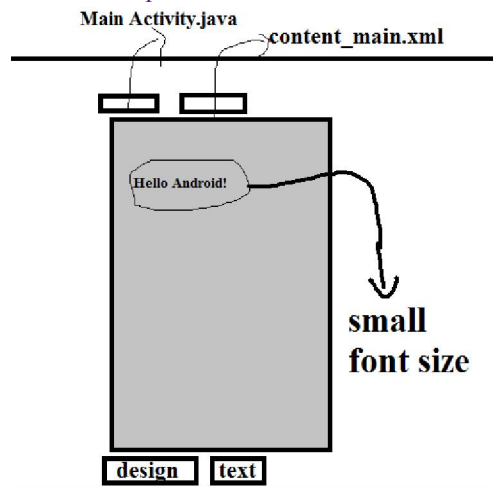
If you add the statement

```
    android:textAppearance
    ="?android:attr/textAppearanceSmall"
after the statement
    android:text="Hello Android!"
```

i.e.,

```
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Hello Android!"
    android:textAppearance
    ="?android:attr/textAppearanceSmall"
/>
```

Then the output on the screen is:



If you replace the statement

```
    android:textAppearance
    ="?android:attr/textAppearanceSmall"
by the statement
```

```
    android:textAppearance
    ="?android:attr/textAppearanceMedium"
Then the font size of Hello Android! will be medium.
```

If you replace the statement

```
    android:textAppearance
    ="?android:attr/textAppearanceSmall"
by the statement
```

```
    android:textAppearance
    ="?android:attr/textAppearanceLarge"
Then the font size of Hello Android! will be large.
```

If add the statement

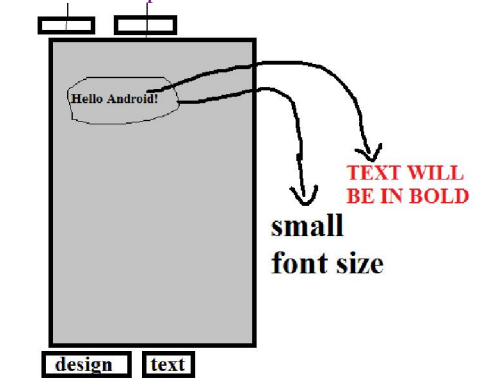
```
        android:textStyle="bold"
```

after the statement

```
    android:textAppearance
    ="?android:attr/textAppearanceSmall"
i.e.,
```

```
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Hello Android!"
    android:textAppearance
    ="?android:attr/textAppearanceSmall"
    android:textStyle="bold"
/>
```

Then the output on the screen is:



If you replace the statement

```
        android:textStyle="bold"
```

by the statement

```
        android:textStyle="italic"
```

Then the text

 Hello Android!

will be in italic format

i.e.,

Hello Android!

If you replace the statement

```
        android:textStyle="bold"
```

by the statement

```
        android:textStyle="bold|italic"
```

Then the text

 Hello Android!

Will appear as:

Hello Android!

If you add the statement

```
        android:textColor="#33b5e5"
```

after the statement

```
        android:textStyle="bold"
```

i.e.,

```
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Hello Android!"
```

```

android:textAppearance
=?android:attr/textAppearanceSmall"
android:textStyle="bold"
android:textColor="#33b5e5"
/>

```

Then the output on the screen is:



If you replace

```
#33b5e5
```

by #33b565

i.e.,

```
android:textColor="#33b565"
```

Then the output on the screen is:



If you add the statement

```
android:textSize="50sp"
```

after the statement

```
android:textColor="#33b5e5"
```

i.e.,

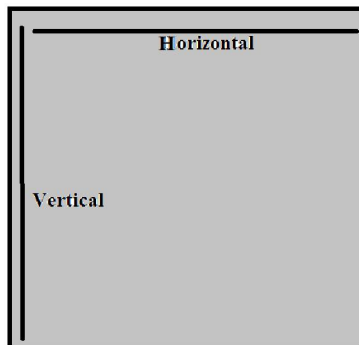
```

<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Hello Android!"
    android:textAppearance
    =?android:attr/textAppearanceSmall"
    android:textStyle="bold"
    android:textColor="#33b5e5"
    android:textSize="50sp"
/>

```

Then the output on the screen is:

50sp corresponds to **Hello Android!**
 100sp corresponds to **Hello Android!**
 150sp corresponds to **Hello Android!**



If you add the statement

```

android:layout_centerHorizontal="true"
after the statement

```

```
    android:layout_height="wrap_content"
```

i.e.,

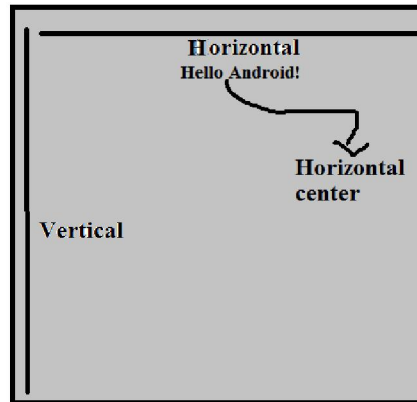
```

<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_centerHorizontal="true"
    android:text="Hello Android!"
    android:textAppearance
    =?android:attr/textAppearanceSmall"
    android:textStyle="bold"
    android:textColor="#33b5e5"
    android:textSize="50sp"
/>

```

>

Then the output on the screen is:



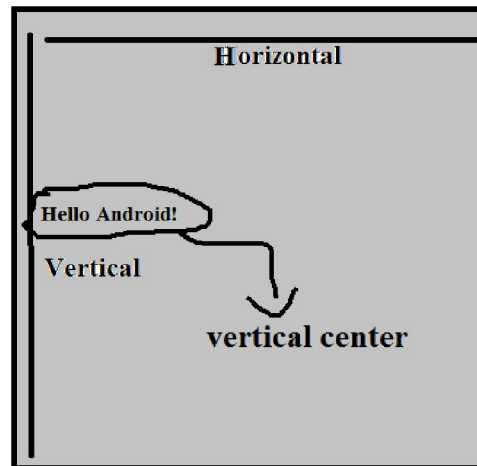
If you replace the statement

```
android:layout_centerHorizontal="true"
```

by the statement

```
android:layout_centerVertical="true"
```

Then the output on the screen is:



If you replace the statement

```
android:layout_centerHorizontal="true"
```

by the statement

```
    android:layout_leftHorizontal="true"
```

Then the output on the screen is:



If you add the statement

```
android:layout_marginTop="30dp"
```

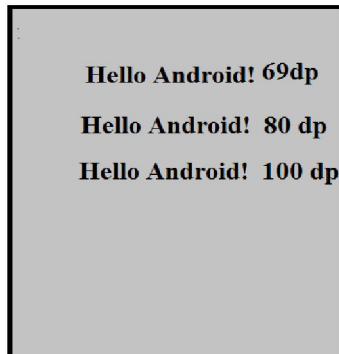
after the statement

```
android:layout_centerHorizontal="true"
```

i.e.,

```
<TextView
  android:layout_width="wrap_content"
  android:layout_height="wrap_content"
  android:layout_centerHorizontal="true"
  android:layout_marginTop="30dp"
  android:text="Hello Android!"
  android:textAppearance
  ="?android:attr/textAppearanceSmall"
  android:textStyle="bold"
  android:textColor="#33b5e5"
  android:textSize="50sp"
/>
```

Then the output on the screen is:



What will be the output on the screen if:

```
<TextView
  android:layout_width="wrap_content"
  android:layout_height="wrap_content"
  android:layout_centerHorizontal="true"
  android:layout_marginTop="30dp"
  android:text="Hello Android!"
  android:textAppearance
  ="?android:attr/textAppearanceSmall"
  android:textStyle="bold"
  android:textColor="#33b5e5"
```

3/1/2016

```
android:textSize="50sp"
/>
```

```
<TextView
  android:layout_width="wrap_content"
  android:layout_height="wrap_content"
  android:layout_centerHorizontal="true"
  android:layout_marginTop="60dp"
  android:text="Hello!"
  android:textAppearance
  ="?android:attr/textAppearanceLarge"
  android:textStyle="bold|italic"
  android:textColor="#33b575"
  android:textSize="90sp"
/>
```

Answer:



What is the difference between SQL and SQLite?

SQL (Structured Query Language) — a standard interactive and programming language for getting information from a database

SQLite – database

References

1. The C Programming Language: The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie.
2. Practical C++ Programming by Steve Oualline.
3. Android For Beginners. Developing Apps Using Android Studio by Barbara Hohensee.
4. Android Application Development All-in-One For Dummies by Barry Burd.
5. Java: Practical Guide for Programmers by Michael Sikora.
6. Getting Started with Android Studio by Barbara Hohensee.
7. Learning Android by Example: Using Android Studio by Frederic Douglas.
8. Android Application Development For Dummies by Donn Felker..
9. Learning Android by Marko Gargenta.