Indian Language App.Development Framework for Android 2.x

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Background

- Indic scripts have been displayed using opentype font after adoption of unicode standard largely at the instance of Microsoft and followed by the free software community also.

- **Unicode** as an International standard is a great thing to have happened and is now accepted as an international standard by the ISO. It looks irreversible

- **Opentype font** - corporate standard initiated by the Microsoft and Adobe

- **Truetype fonts** is a standard created by Adobe but with sufficient wide spread usage and with adequate tools even in the free software domain.

Unicode

Unicode provides a unique number for every character-

- no matter what the platform,
- no matter what the program,
- no matter what the language.

- Devanagari – 0090 to 097F

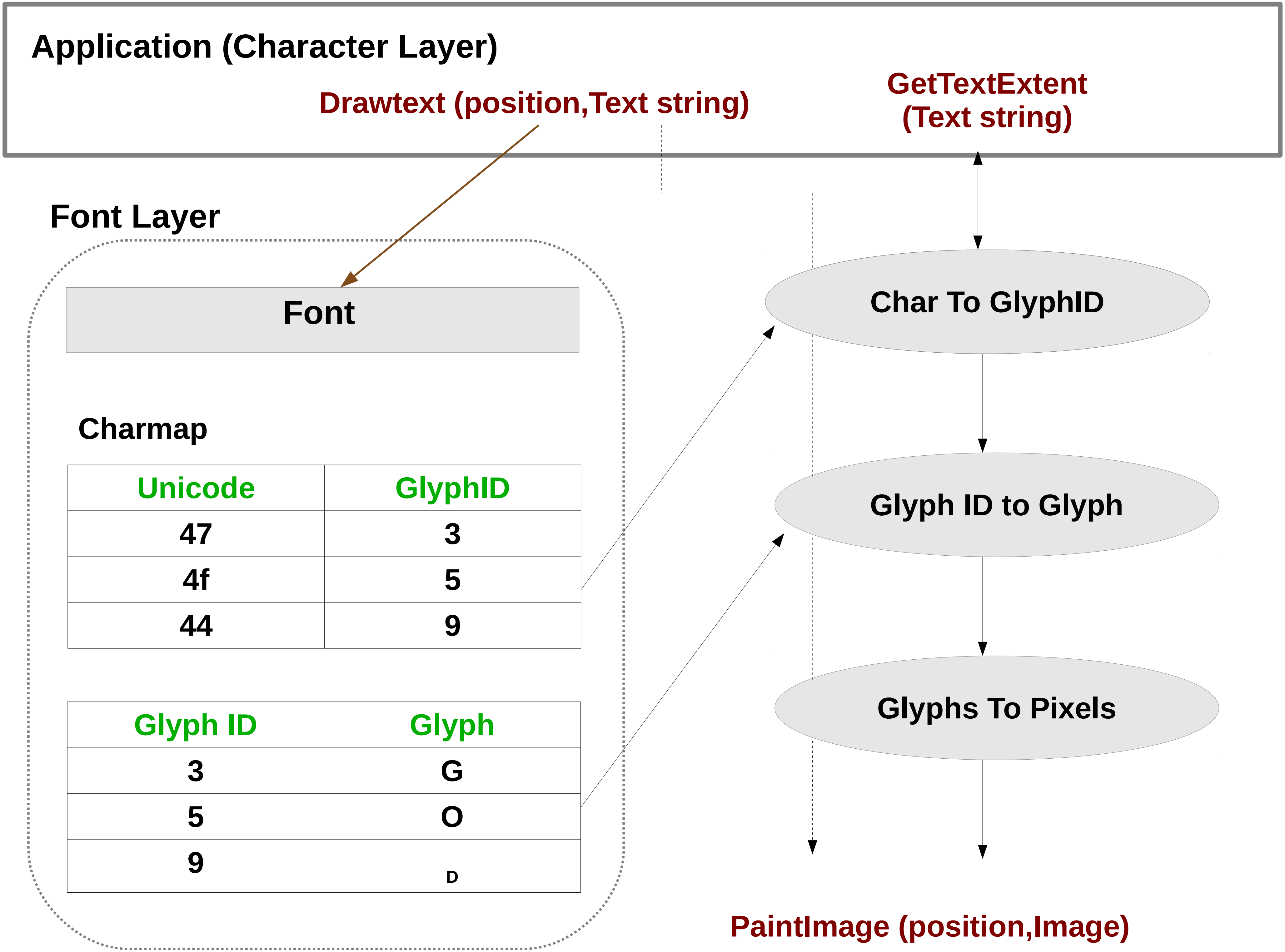
- Latin Alphabets A to Z – U0041 to U005A
  a to z – U0061 to U007A

OpenType Vs TrueType

•Opentype font is highly intelligent font that has advanced features like ligatures, anchor points, anchor classes etc.

•Truetype font is simple font with no special features unlike Opentype Font.

Text Rendering Process -Latin Script



Application (Character Layer)

Drawtext (position,Text string)

GetTextExtent (Text string)

Font Layer

Font

Charmap

Unicode	GlyphID
47	3
4f	5
44	9

Glyph ID	Glyph
3	G
5	O
9	D

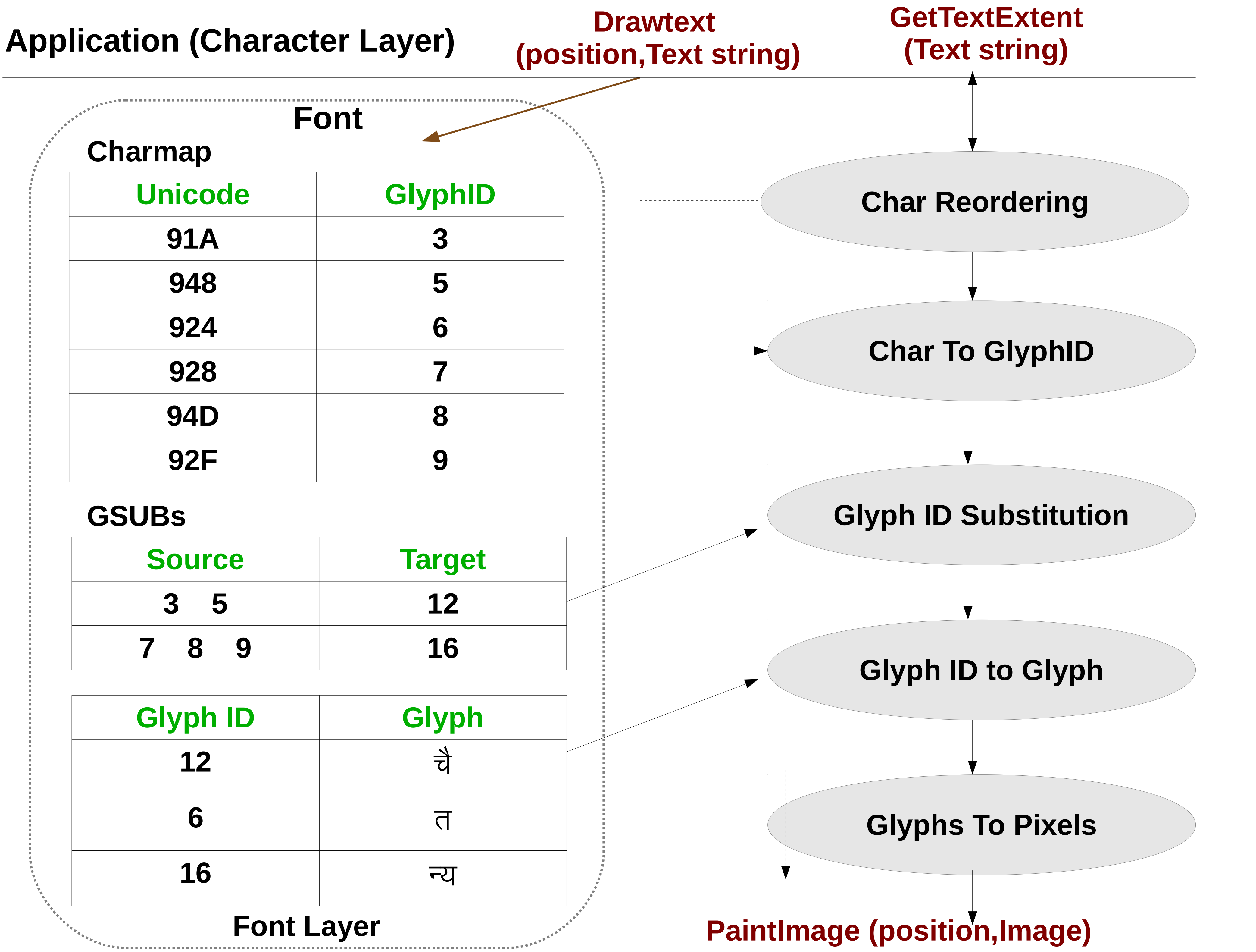
Char To GlyphID

Glyph ID to Glyph

Glyphs To Pixels

PaintImage (position,Image)

Text Rendering Process -Complex Scripts



Application (Character Layer)

Drawtext (position,Text string)

GetTextExtent (Text string)

Font

Charmap

Unicode	GlyphID
91A	3
948	5
924	6
928	7
94D	8
92F	9

GSUBs

Source	Target
3 5	12
7 8 9	16

Glyph ID	Glyph
12	चै
6	त
16	न्य

Font Layer

PaintImage (position,Image)

Android_Indic -Current Scenario

- Andorid supports OTF (Open Type Fonts)

- Java.text library that is used for drawing text

```
private void drawText(Canvas canvas)
{
paint.setColor(Color.WHITE);
paint.setTextSize(48);
    canvas.drawText(text, 60, 300, paint);
}
```

- core rendering mechanism is only supported for Latin Scripts. Indic text will display without re-ordering

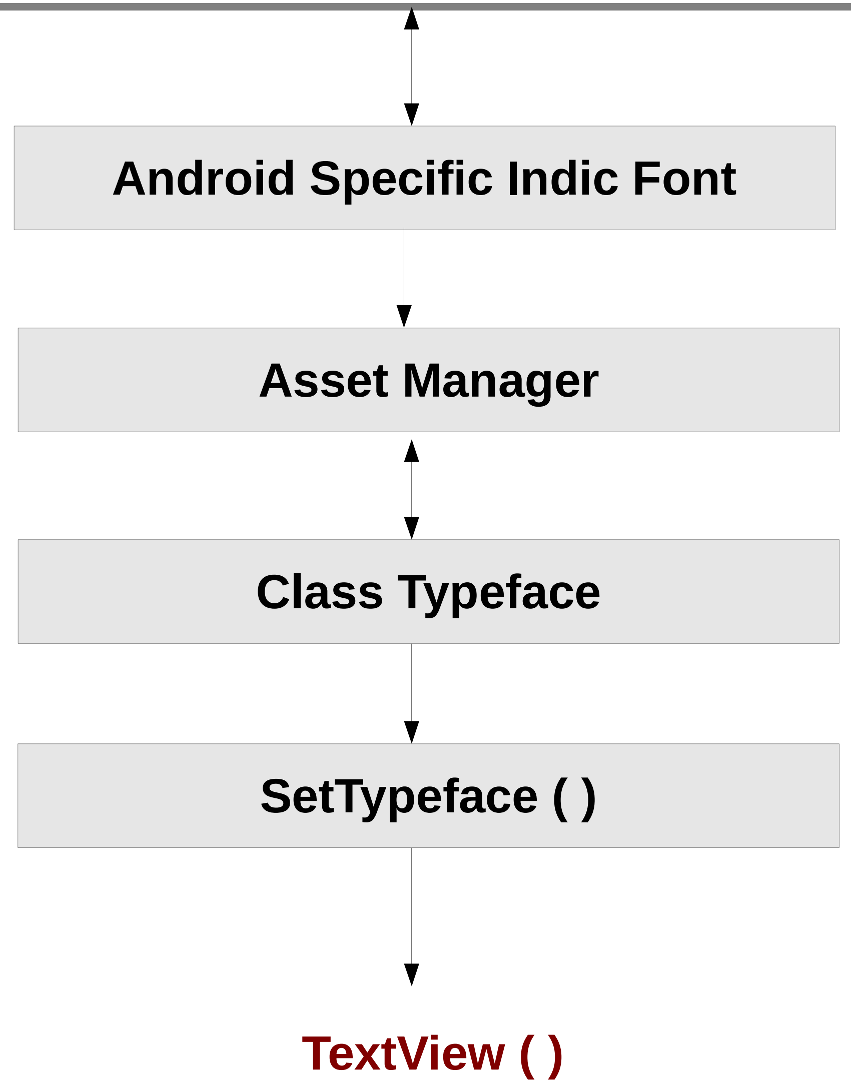
- Android 4.1 supports indian languages -
  Not sure how the rendering is happening in backend

Approach & Methodology

Multibyte Unicode Truetype font & Library

Rendering Engine - Text Conversion

(Convert Unicode encoded text into Android Encoded text)



Android Specific Indic Font

Asset Manager

Class Typeface

SetTypeface ( )

TextView ( )

Approach & Methodology - Font

New glyphs and encodings added for conjucts where necessary

1)To eliminate use of halant with consonants , half forms of almost all consonants are created .

क्क , क्ख, ग्र

2) Vatu forms (Consonant + Halant + Consonant LetterRA(u0930 र)) are also created in same manner

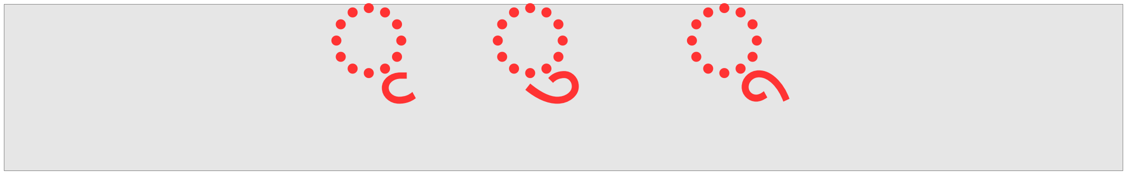
म्र, क्र, व्र

Approach & Methodology -Font

- Conjuncts which included combination of more than one consonants, half forms etc. are also created new.

स्त्र

- Few of the dependent vowels are duplicated in Latin 1 supplementary range to make conjucts look proper when these dependent vowels come along with consonants like LetterKA(u0915 क), LetterPHA(u092b फ), etc.



Approach & Methodology - Lib

- Right bearings of imported glyphs are unset. All right bearings are away from the end of glyph.

Word : काम

Character Sequence : क + ◌ा + म

Without OpenType Font Support : क ◌ा म

Approach & Methodology - Lib

- Consonant is followed by Symbol( ) then symbol appears after the consonant but actually it should be processed in such a way that it appear prior to consonant

Eg:

Word : ट्रिम

Character Sequence : ट + ् + र + ि + म

With Out OpenType Font Support : ट्र ि म

Sample

```
package com.indic.test;

import android.graphics.Typeface;
import android.widget.TextView;

public class IndicTest extends Activity {
public void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.main);
TextView AndroidHindi=(TextView)findViewById(R.id.AndroidHindiFont);

TextView AndroidGuj=(TextView)findViewById(R.id.AndroidGujFont);

Typeface Hindi=Typeface.createFromAsset(getAssets(),"fonts/AndroidHindi.ttf");

Typeface Guj=Typeface.createFromAsset(getAssets(),"fonts/AndroidGuj.ttf");

AndroidHindi.setTypeface(Hindi);

AndroidGuj.setTypeface(Guj);
}}
```

Sample

```
    <TextView
         android:layout_width="fill_parent"
         android:layout_height="wrap_content"
         android:text="@string/hello" />
     <TextView
         android:id="@+id/AndroidGujFont"
         android:layout_width="fill_parent"
         android:layout_height="wrap_content"
         android:text="AndroidGuj-- પતĔગય, હ¹તમથન, ઓlĔ¹ĒĔલયન, ĔલĔવગન
" />
     <TextView
         android:id="@+id/AndroidHindiFont"
         android:layout_width="fill_parent"
         android:layout_height="wrap_content"
         android:text="AndroidHindi-- ि◌वषयों , और मागÜ,řवयोग, आपोआप, řवषय,
řŁमीतीय" />
</LinearLayout>
```

References

- Project Setu :By C-DAC Mumbai
- Project Indix : By C-DAC Mumbai
- AOSP Source & Documentation
- Unicode Chart - http://www.unicode.org/charts/

Thank You

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