Abstraction & Graphics. Representing Color
Binary, Base 16 - Hexadecimal, Packing & Unpacking Color
MP3 regraded Mon 8pm. MP4-Photoscoop! will be out this weekend

Android's Canvas class -
boolean   clipPath(Path path)
void   concat(Matrix matrix) Preconcat the current matrix with the specified matrix.
void   drawARGB(int a, int r, int g, int b)
Fill the entire canvas' bitmap (restricted to the current clip) with the specified ARGB color, using srcover porterduff mode.
void   drawArc(RectF oval, float startAngle, float sweepAngle, boolean useCenter, Paint paint)
Draw the specified arc, which will be scaled to fit inside the specified oval.
void   drawBitmap(Bitmap bitmap, Matrix matrix, Paint paint)
Draw the bitmap using the specified matrix.
void   drawBitmap(int[] colors, int offset, int stride, float x, float y, int width, int height, boolean hasAlpha, Paint paint)
Treat the specified array of colors as a bitmap, and draw it.
void   drawBitmap(Bitmap bitmap, Rect src, Rect dst, Paint paint)
Draw the specified bitmap, scaling/translating automatically to fill the destination rectangle.
void   drawBitmap(Bitmap bitmap, float left, float top, Paint paint)
Draw the specified bitmap, with its top/left corner at (x,y), using the specified paint, transformed by the current matrix.
void   drawBitmap(int[] colors, int offset, int stride, int x, int y, int width, int height, boolean hasAlpha, Paint paint)
Legacy version of drawBitmap(int[] colors, ...) that took ints for x,y
void   drawBitmap(Bitmap bitmap, Rect src, RectF dst, Paint paint)
Draw the specified bitmap, scaling/translating automatically to fill the destination rectangle.
void   drawCircle(float cx, float cy, float radius, Paint paint)
Draw the specified circle using the specified paint.
void   drawColor(int color)
Fill the entire canvas' bitmap (restricted to the current clip) with the specified color, using srcover porterduff mode.
void   drawColor(int color, PorterDuff.Mode mode)
Fill the entire canvas' bitmap (restricted to the current clip) with the specified color and porter-duff xfermode.
void   drawLine(float startX, float startY, float stopX, float stopY, Paint paint)
Draw a line segment with the specified start and stop x,y coordinates, using the specified paint.
void   drawLines(float[] pts, Paint paint)
void   drawLines(float[] pts, int offset, int count, Paint paint)
Draw a series of lines.
void   drawOval(RectF oval, Paint paint)
Draw the specified oval using the specified paint.
void   drawPaint(Paint paint)
Fill the entire canvas' bitmap (restricted to the current clip) with the specified paint.
void   drawPath(Path path, Paint paint)
Draw the specified path using the specified paint.
Save the canvas state, draw the picture, and restore the canvas state.
void   drawPoint(float x, float y, Paint paint)
Helper for drawPoints() for drawing a single point.
void   drawPoints(float[] pts, int offset, int count, Paint paint)
Draw a series of points.
void   drawPoints(float[] pts, Paint paint)
Helper for drawPoints() that assumes you want to draw the entire array
void   drawPosText(String text, float[] pos, Paint paint)

Java's Graphics2D class
abstract void   drawRoundRect(int x, int y, int width, int height, int arcWidth, int arcHeight)
     Draws an outlined round-cornered rectangle using this graphics context's current color.
abstract void   drawString(AttributedCharacterIterator iterator, int x, int y)
     Renders the text of the specified iterator applying its attributes in accordance with the specification of the TextAttribute class.
abstract void   drawString(String str, int x, int y)
     Draws the text given by the specified string, using this graphics context's current font and color.
 void   fill3DRect(int x, int y, int width, int height, boolean raised)
     Paints a 3-D highlighted rectangle filled with the current color.
abstract void   fillArc(int x, int y, int width, int height, int startAngle, int arcAngle)
     Fills a circular or elliptical arc covering the specified rectangle.
abstract void   fillOval(int x, int y, int width, int height)
     Fills an oval bounded by the specified rectangle with the current color.
abstract void   fillPolygon(int[] xPoints, int[] yPoints, int nPoints)
     Fills a closed polygon defined by arrays of x and y coordinates.
 void   fillPolygon(Polygon p)
     Fills the polygon defined by the specified Polygon object with the graphics context's current color.
abstract void   fillRect(int x, int y, int width, int height)
     Fills the specified rectangle.
abstract void   fillRoundRect(int x, int y, int width, int height, int arcWidth, int arcHeight)
     Fills the specified rounded corner rectangle with the current color.
 void   finalize()
     Disposes of this graphics context once it is no longer referenced.
abstract Shape   getClip()
     Gets the current clipping area.
abstract Rectangle   getClipBounds()
     Returns the bounding rectangle of the current clipping area.
 Rectangle getClipBounds(Rectangle r)
     Returns the bounding rectangle of the current clipping area.
 Rectangle getClipRect()
     Deprecated. As of JDK version 1.1, replaced by getClipBounds().
abstract Color   getColor()
     Gets this graphics context's current color.
abstract Font   getFont()
     Gets the current font.
 FontMetrics   getFontMetrics()
     Gets the font metrics of the current font.
abstract FontMetrics getFontMetrics(Font f)
     Gets the font metrics for the specified font.
 boolean   hitClip(int x, int y, int width, int height)
     Returns true if the specified rectangular area might intersect the current clipping area.
abstract void   setClip(int x, int y, int width, int height)
     Sets the current clip to the rectangle specified by the given coordinates.
abstract void   setClip(Shape clip)
     Sets the current clipping area to an arbitrary clip shape.
abstract void   setColor(Color c)
     Sets this graphics context's current color to the specified color.
abstract void   setFont(Font font)
     Sets this graphics context's font to the specified font.
abstract void   setPaintMode()
     Sets the paint mode of this graphics context to overwrite the destination with this graphics context's current color.
abstract void   setXORMode(Color c1)
     Sets the paint mode of this graphics context to alternate between this graphics context's current color and the new specified color

Representing Color

What color is (red=100%, green = 0%, blue = 0%)?

Design a solution to work in base 10 How would you represent this color as a single integer?
e.g. This color is represented by the integer 900.

Now think in base2, What color is $11111111111111111111111_2$

WHY:?
int red = (rgb>>16) & 0xff;
int green = (rgb >> 8) & 0xff;
int blue = (rgb) & 0xff;
or in reverse... Why?
int rgb = (red<<16) | (green <<8) | (blue);

Thinking in Base 16
one hexadecimal digit = 4 bits.

Convert 0xFF to binary.

Convert 0xFF3333 to binary:

Convert 0xBAADF00D to binary:

Convert $111111110001000001010101_2$ to hexadecimal

Evaluate 7 << 2 ?
Evaluate 7 >> 2 ?

Evaluate 0x33ff33 >> 8

Binary Truth Tables.

A B   A AND B   A OR B
0 0
0 1
1 0
1 1

10	Hex	Binary
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	
9	9	
10	A	
11	B	
12	C	
13		
14		
15		