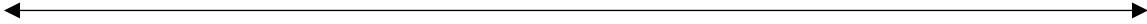


## Computer Graphical systems

## Assignment 1

**STANLEY NGUGI**

**SCT212-0065/2017**



- a) Read on various image formats such as Ai, wmf, Cmx, cgm,svg ,odg, eps , dxf , bmp, jpeg ,Gif ,Tiff,PICT and png.
- Explain what the abbreviation stands for and some history on the format
  - State whether each of the graphic format above is raster or vector
  - Briefly explain a typical application or area of usage of each of the format

**AI**

AI is short for Artwork File. AI file format is a vector-based file format used by Adobe Illustrator to save an artwork file. AI files are vector based. An AI file is composed of paths connected by points, rather than bitmap image data.

AI files are commonly used for logos and print media. AI files can be used for video editing.

Applications that can read AI file format include Adobe Illustrator and Corel Draw among others

Adobe's first application was released in 1987 for Apple Macintosh. Among its significant features was its pen tool, which enabled the user to draw smooth curves and create high resolution shapes and images. In 1989 Adobe released Illustrator for Microsoft Windows Personal computers. The AI file format was originally a native format called PGF. PDF compatibility is achieved by embedding a complete copy of the PGF data within the saved PDF format file. Adobe Illustrator was reviewed as the best vector graphics editing program in 2018.

**WMF**

WMF is short for Windows Metafile. WMF files contain both vector graphics and raster components at the same time. It includes sort of programming commands which enables the creation of lines, circles, and rectangles on the viewing applications. The 16-bit image format is portable between applications.

PaintShop software can read and modify WMF files.

WMF image format was designed by Microsoft in the 1990s for their Windows Operating System. The original version of wmf files was machine dependent which made it unreliable. The format could however blend both vector and raster graphics. Enhanced Metafiles which were machine independent later replaced WMF.

**CMX**

Files with CMX extension are image file format used as presentation by CoreSuite applications. The format contains image data as vector graphics as well as metadata that describes the image. CMX files

can be opened by CorelDraw, Corel Presentations, Paint Shop Pro and some versions of Adobe Illustrator.

CMX format was developed in 1989 to bundle the desktop publishing systems. Corel draw 1.x and 2.x ran under Windows 2.x and 3.0. Corel draw 3.0 came into its own with microsofts release of windows 3.1. The inclusion of Truetype in Windows 3.1 transformed Corel Draw unto a serious illustration program capable of using system installed outline fonts without requiring third-party software paired with a photo editing program, a font manager and several other pieces of software.

### **CGM**

CGM is short for Computer Graphics Metafile. CGM is a vector-based feature-rich format which attempts to support the graphic needs of many general fields. The CGM format has numerous elements to provide functions and to represent entities, so that a wide range of graphical information and geometric primitives can be accommodated. Rather than establish an explicit graphics file format, CGM contains the instructions and data for reconstructing graphical components to render an image using an object-oriented approach.

Engineering, aviation, and other technical applications make use of this file format.

CGM is used for CAD drawings, storage and exchanging vector graphics(2D), raster graphics and text.

CGM was Initially released in 1986 and is extended from Graphic Kernel System. The format was later advanced by ISO, IEC AND W3C.

### **SVG**

Scalable Vector Graphics (SVG) is a vector based that describes images using a text format that is based on XML. SVG being a standard graphics file type is used for rendering two-dimensional images. In for SVG files all elements and attributes can be animated. SVG images can be created with a text editor or a drawing program like Inkscape.

SVG was developed by the W3C SVG Working Group starting in 1998.

The flexibility of the file format makes it convenient for use in web applications as they can be searched, indexed, scaled, and compressed and can result in smaller file sizes than other file formats.

### **ODG**

Open Document Graphic File is a vector-based format which defines an image using points, lines, and curves.

OASIS OpenDocument software application, such as the OpenOffice Draw application are saved with the .odg file extension.

ODG files are used for logos, illustrations, and other drawings.

ODG was developed by a technical committee in the Organization for the Advancement of Structured Information Standards (OASIS) consortium. It was based on the Sun Microsystems specification for OpenOffice XML, the default format for OpenOffice.org and LibreOffice. It was originally developed for StarOffice to provide an open standard for office documents.

## **EPS**

Encapsulated PostScript File Format usually abbreviated as EPS and sometimes as EPSF, is a Vector Based format designed for printing to PostScript printers and imagesetters. EPS files are created and edited in illustration programs such as Adobe Illustrator or CorelDRAW.

EPS was developed in the late 1980s by Adobe Systems Incorporated to facilitate the incorporation of illustrations into textual documents for printing. EPS is still in use, but it is essentially an outdated file format that no longer evolves. It has been replaced by the native file formats of Adobe applications.

## **DXF**

DXF is short for Drawing Interchange Format or Drawing Exchange Format.

DXF file format is vector based open-source, and is uniquely structured for Autodesk 2D and 3D drawings and models.

DXF was originally introduced in December 1982 as part of AutoCAD 1.0, and was intended to provide an exact representation of the data in the AutoCAD native file format, DWG (Drawing).

## **BMP**

BMP is a raster graphics image file format used to store bitmap digital images. The files can store two-dimensional digital images with both monochrome and color. Various Color Depths, alpha channels, color profiles and optional data compression are supported in this format.

PaintShop software can read BMP files.

The Original format was created for Windows 1.0 and was very simple. It had a fixed color palette, did not support bitmap data compression and was designed to support the most popular IBM PC graphics cards in use at the time.

Can be used for storing crisp and high-quality images because it can store color data for each pixel in the image without any compression. It supports various color depths, alpha channels, color profiles and optional data compression thus making it relatively versatile.

## **JPEG**

JPEG, short for Joint Photographic Experts Group, is a raster-based file format used commonly in photography. It is a standard image format for containing lossy and compressed image data. It is also the most common format for storing and transmitting photographic images on the World Wide Web.

JPEG Offers the most flexibility with raster editing and compression making them ideal for web images that need to be downloaded quickly.

In 1983 researchers with ISO started working on ways to add photo quality graphics to the text only computer terminal screens of the day. In 1986, JPEG was formed to create a new standard named the JPEG standard that used data compression to keep graphic files small.

## **GIF**

Graphics Interchange Formats (GIFs) is a raster-based format used for animated graphics.

Giffs are used in a variety of application areas such as web applications

Compuserve introduced GIF in 1987 to provide a color image format for their file downloading areas. This replaced the earlier run length encoding format which was black and white only. It became popular because it used LZW data compression. Now fairly large images could be downloaded quickly even with slow modems. Original version was called 87a, and later the enhanced version was called 89a.

### TIFF

Tagged Image File Format (TIFF) is a raster-based image format that commonly used for print. TIFFs are often used for desktop publishing and graphic design. TIFF is very common for transporting color or gray-scale images into page layout applications, but is less suited to delivering web content

It was created as an attempt to get desktop scanner vendors of the mid-1980s to agree on a common scanned image file format, in place of a multitude of proprietary formats. In 1988 October, revision 5.0 was released and it added support for palette color images and LZW compression.

### PICT

PICT is a graphics file format that allows the interchange of graphics (both raster and vector), and some limited text support, between Mac applications. It was the native graphics format of QuickDraw.

Pict was developed by Apple Computer in 1984 as the native format for Macintosh graphics.

### PNG

Portable Network Graphics is a raster-graphics file format that supports lossless data compression. PNG was developed as an improved, non-patented replacement for Graphics Interchange Format. It is the most frequently used uncompressed raster image format on the internet.

**b) Calculate the points between the starting point (7,1) and ending point (14, 3). and plot the line using the below algorithms (show the calculations and attach the code as zipped files).**

#### **1. Bresenham's Line-Drawing Algorithm**

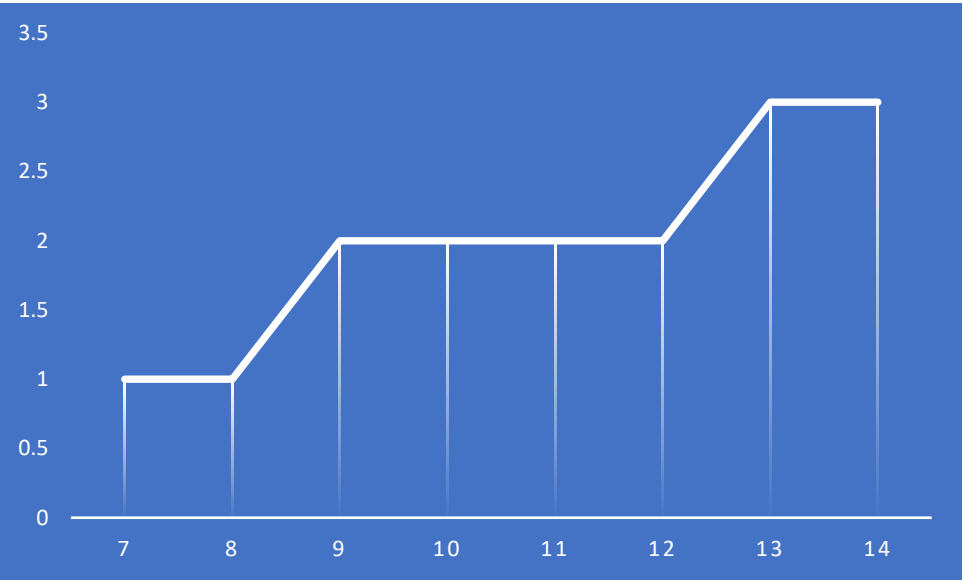
$$\Delta y = 2$$

$$2\Delta y - \Delta x = -3;$$

$$< 0$$

$P_k$	$P_{k+1}$	$X_{k+1}$	$Y_{k+1}$
		7	1
-3	1	8	1
1	-9	9	2
-9	-5	10	2
-5	-1	11	2
-1	3	12	2

3	-7	13	3
-7	-3	14	3



## 2. Midpoint Line-Drawing Algorithm

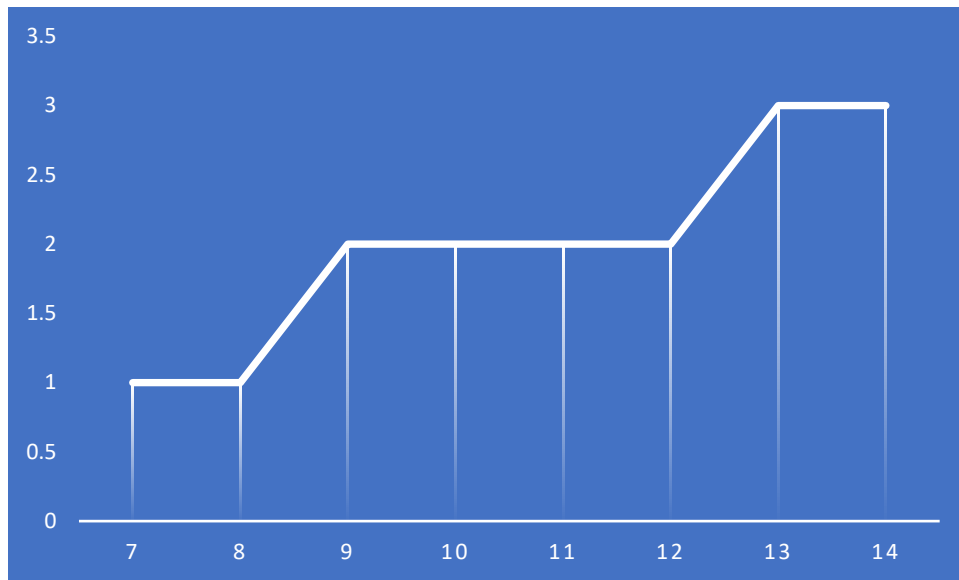
$$\Delta Y=2$$

$$\Delta X=7$$

$$D_{initial} = 2(2)-7 = -3$$

$$\Delta D = 2(2-7) = -10$$

D <sub>initial</sub>	D <sub>new</sub>	X <sub>k+1</sub>	Y <sub>k+1</sub>
		7	1
-3	1	8	1
1	-9	9	2
-9	-5	10	2
-5	-1	11	2
-1	3	12	2
3	-7	13	3
-7	-3	14	3



### 3. DDA line drawing Algorithm

S(7,1),

E(14,3)

$\Delta y / \Delta x = 2/7$ ;

$M = 0.3$ ;

$M < 1$

$\text{Abs } \Delta x > \text{Abs } \Delta y$ ;

steps =  $\Delta x = 7$

$X_p$	$Y_p$	$X_{p+1}$	$Y_{p+1}$	Round(X,Y)
7	1	8	1.3	(8,1)
		9	1.6	(9,2)
		10	1.9	(10,2)
		11	2.2	(11,2)
		12	2.5	(12,3)
		13	2.8	(13,3)
		14	3.1	(14,3)

