(K*nowledge for Development)*

KIBABII UNIVERSITY COLLEGE

A CONSTITUENT COLLEGE OF

MASINDE MULIRO UNIVERSITY OF

SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATIONS

2014/2015 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER

MAIN EXAMINATION

FOR THE DEGREE OF BSC COMPUTER SCIENCE

COURSE CODE: CSC 420

COURSE TITLE: COMPUTER GRAPHICS

DATE: 4TH MAY, 2015 **TIME:** 11.30 AM-1.30PM

INSTRUCTIONS TO CANDIDATES

Answer Question One in Section A and Any other TWO (2) Questions in Section B

TIME: 2 Hours

INSTRUCTIONS

Answer **QUESTION ONE a**nd **ANY** other **TWO QUESTIONS**.

QUESTION ONE

a. Define the following terms as used in computer graphics [4 Marks]
   i. Scan conversion
   ii. Memory mapping
b. Write a pseudo code of the brute force slope intercept method line drawing algorithm that uses the parametric equation $y = mx + c$ to draw a line. [5 Marks]
c. Write the DDA circle drawing algorithm. [6 Marks]
d. An RGB image is 40 x 50 millimeters at 10000 pixels per centimeter.
   i. Calculate the size of the image in pixels. [3 Marks]
   ii. Calculate the images' aspect ratio. [2 Mark]
   iii. Calculate the amount of memory occupied by the image on a computer's hard disk. [4 Marks]
e. With valid examples, differentiate between animation and simulation as used in computer graphics. [6 Marks]

QUESTION TWO

a. Define the term virtual reality as used in computer graphics. [2 Marks]
b. Explain the following animation techniques used in computer graphics. [3 Marks]
   i. Morphing
   ii. Cel Animation
   iii. Colour Cycling
c. State **THREE** weaknesses of the brute force line drawing algorithm that uses the parametric equation $y = mx + c$ to draw a line. Highlight the solution for each weakness stated. [6 Marks]
d. Write a code except for an algorithm that draws a circle whose center is at (0, 0) by plotting eight symmetric points on the circle's circumference using polar equations. [5 Marks]
e. Write a pseudo code for the steps of the Cohen-Sutherland Subdivision line clipping algorithm. [4 Marks]

QUESTION THREE

a. What is image clipping as used in computer graphics? [2 Mark]
b. Briefly explain the Digital Differential Analyzer (DDA) line conversion algorithm. [5 Marks]
c. Write the Bresenham's line drawing algorithm. [4 Marks]
d. Write a Java program that draws a cylinder of radius 50mm and height 100mm. [4 Marks]

e. With an illustration, briefly explain the Cohen-Sutherland line clipping algorithm. [5 Marks]

QUESTION FOUR

a. Define the term aliasing as used in computer graphics. [3 Marks]
b. State two advantages and two disadvantages of Digital Differential Analyzer (DDA) line conversion algorithm. [4 Marks]
c. Explain **TWO** anti-aliasing techniques commonly used in computer graphics. [4 Marks]
d. Explain any **TWO** scenarios on how computer graphics can be applied in education. [4 Marks]
e. Explain the Sutherland-Hodgman Polygon clipping algorithm. [5 Marks]

QUESTION FIVE

a. Define the term computer graphics? [2 Marks]
b. Explain the steps required to generate a circle using Bresenham's Circle Algorithm. [4 Marks]
c. Briefly explain how seed fill polygon filling method works. [3 Marks]
d. Briefly explain the Liang-Barsky line clipping algorithm. [4 Marks]
e. Briefly explain the Non-Zero Winding Number Rule used to determine if a point lies within a polygon. [4 Marks]
f. Write the steps of point clipping algorithm. [3 Marks]