



DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

MACHAKOS UNIVERSITY

SECOND SEMESTER, 2019/2019 ACADEMIC YEAR

**FORTH YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN STATISTICS AND PROGRAMMING**

SMA 493: DEVELOPMENT OF SOFTWARE ENGINEERING

STREAM: BSC. STATISTICS

TIME: 2 HRS

EXAMINATION SESSION: APRIL

YEAR 2020

INSTRUCTIONS

- i) Answer question ONE and any other TWO questions**
- ii) Write on both sides of the answer sheet**
- iii) Begin each new answer on a separate page of the answer sheet**

Question ONE (Compulsory, 30 marks)

- a) Compare
 - i. Software to a program **(2 marks)**
 - ii. a metric to a measure **(2 marks)**
 - iii. A software process to a software model **(2 marks)**
 - iv. Software Engineering to Systems engineering **(2 marks)**
- b) Analyse Software metrics in terms of
 - i. Size **(5 marks)**
 - ii. Control Flow **(5 marks)**
- c) In software engineering why is measurement essential? **(4 marks)**



- d) Use an example in each case to describe the following measurement scales
- i. Nominal (2 marks)
 - ii. Ordinal (2 marks)
 - iii. Ratio (2 marks)
 - iv. Interval (2 marks)

Question TWO (20 marks)

- a) Compare and contrast between Generic and Bespoke products (10 marks)
- b) Discuss why software engineering is different from other engineering disciplines (10 marks)

Question THREE (20 marks)

- a) What are the attributes of good software? (5 marks)
- b) Analyse McCabe Cyclomatic Complexity metric in terms of structure (5 marks)
- c) Given the following program fragment written in C programming language, answer the following questions:

```

while (c) {

    x = y + 1;

    y = 2 * z;

    If(d) x = y + z;

    z = 1;

}

z = x;

```

- i) Draw a Directed graph for the program section (5 marks)
- ii) Compute the program section's Cyclomatic Complexity (5 marks)

Question FOUR (20 marks)

- a) Analyse Halstead's Software Metric (10 marks)
- b) A given project has 5 user inputs, 10 user outputs, 7 inquiries, 5 files, and 3 external interfaces. All of these are average complexity EXCEPT 2 of the inputs are complex, two of the outputs are complex, and one of the outputs is simple. Adjustment factors are all moderate except that the system will require a significant amount of online data entry, and it is essential that the

code is designed with reuse in mind. Calculate the number of Function Points for this system. (Show all your workings). **(10 marks)**

Question FIVE (20 marks)

In a software project the following characteristics were obtained as shown in the table below:

Function Type	Estimated Count	Weight
EI	20	Average(4)
EO	19	High(7)
EQ	21	Low(4)
ILF	3	Average(10)
ELF	4	High(10)

In addition, the software system had a low (2) degree of influence in all other general system elements except the ones shown in the table below:

General system characteristics	Degree of influence
Data communication	Strong Influence(5)
Transaction rate	Strong Influence(5)
Online update	Strong Influence(5)
Reusability	Moderate(4)
Ease of operation	Moderate(4)

- Compute the Total Unadjusted Function Point Count (UFP) **(5 marks)**
- Compute the value of Total Degree of Influence (TDI) **(5 marks)**
- Compute Value Adjustment Factor (VAF) **(5 marks)**
- Estimate the Value of Function Point (FP) **(5 marks)**
