

**CHUKA UNIVERSITY**  
University Examinations 2020/2021

**FOURTH YEAR SEMESTER 1 EXAMINATION FOR THE DEGREE OF  
BACHELOR OF SCIENCE IN COMPUTER SCIENCE  
COSC 434: COMPONENT BASED ARCHITECTURES**

**DATE: MARCH 2021**

**TIME: 2 HOURS**

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*Instructions: Answer Question 1 and Any Other Two.*

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**QUESTION ONE (30 Marks)**

- a) In component-oriented programming, we require that a component is in binary form and to be independently deployable. Discuss why these requirements are essential for component-oriented programming. [4 Marks]
- b) List any **Four** different forms of components along with brief explanation for each. [4 Marks]
- c) Discuss any **Three** principles of component-oriented programming. [6 Marks]
- d) Draw a component chart for a Button component. It has the following properties: foreground color, background color, name, size, and image. It has a pair of methods (setter and getter) for each property above to set or get the property value. It has one event: pressButton. [6 Marks]
- e) Create a JavaBean component that displays the current time and date. [4 Marks]
- f) Explain **Three** different ways of you instantiating a bean. [6 Marks]

**SECTION B: ATTEMPT ANY TWO QUESTIONS (40 MARKS)**

**QUESTION TWO (20 MARKS)**

- a) Use component charts to describe the following component-based software system: A student information system consists of a user login component, a modifying component for faculty to upload student grades, and displaying component for students to check their grades on-line through a Web browser. [6 Marks]
- b) List any **Four** are the major differences between EJB and Javabeans. [4 Marks]
- c) Differentiate between a local EJB object interface and a remote interface. [4 Marks]
- d) Design a stateful session bean that provides a calculator services. The calculator has the functionality to perform addition, subtraction, multiplication, and division of two real numbers. It can also detect the zero divisors in division operation. Use namespace in this component. [6 Marks]

### QUESTION THREE (20 MARKS)

- a) Design an on-line auction business application using entity beans and session beans and other Java Web components. The business includes all routine auction activities such as bidding price, starting price, current highest bid price, time period control, winner notification. [6 Marks]
- b) Design a Java CORBA component that provides services of a calculator. The calculator has the functionality to perform addition, subtraction, multiplication, and division of two real numbers. It can also detect a zero divisor in division operation. [6 Marks]
- c) Describe the difference between BOA and POA. [4 Marks]
- d) Explain the process of CCM packaging, assembling, and deployment. [4 Marks]

### QUESTION FOUR (20 MARKS)

- a) Design a client program using asynchronous delegate to let a server component to call back when the server component completes the request from a client. [6 Marks]
- b) Differentiate between the component model, the connection model and the deployment model in OSGi component infrastructure. [6 Marks]
- c) Develop an OSGi component to provide fax services for your home business. [6 Marks]
- d) List any **Two** essential characteristics of a software component. [2 Marks]

### QUESTION FIVE (20 MARKS)

- a) Differentiate between MS DCOM, .NET components, and Web services components. [6 Marks]
- b) Differentiate between asynchronous interaction and synchronous interaction with a Web service. [4 Marks]
- c) Explain why “Component standards are essential for component markets to develop and thrive.” [6 Marks]
- d) List any **Four** goals for component-oriented programming. [4 Marks]