

Undergraduate Programme
Department of Computer Science And Mathematics
Semester 2 Year 2019

FINAL COURSE EXAMINATION PAPER

ITC 216 – SOFTWARE DESIGN & PROGRAMMING

Important Instructions to Students:

1. Read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes reading time** (during this time, you are not allowed to write with pen) and **180 minutes (3 Hours) to complete this paper**.
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask from the supervisor. Write your name, course code and student identification number in the answer booklet and in the attendance sheet.
5. **This Final Course Examination Paper is worth 100 marks contributes 50% of the total course assessments.**
6. This paper contains one (1) section A. All questions are compulsory to answer.
7. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
8. This is a **Closed Book Examination**. The University views plagiarism, cheating and dishonest practice as serious offences and if found, offenders are penalized.

Examination Paper Content (Format):

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1-11	Short Answer Questions	100	180 minutes
		TOTAL	100	180 Minutes

Question 1 – An introduction to Visual Basic 2015 & Designing Applications**[9 Marks]**

- A. What is the purpose of using an ampersand? Give an example. [1]
- B. Explain how to delete a control that already contains code. [1]
- C. Explain the difference between a form file and a form. [1]
- D. What is the purpose of ControlBox property in the form design, explain thoroughly its purpose. [1]
- E. Listed below are the four steps you should follow when planning an OO application. Put the steps in the proper order by placing a number (1 through 4) on the line to the left of the step. [1]
- | | |
|-------|--|
| _____ | Identify the objects to which you will assign the tasks. |
| _____ | Draw a sketch of the user interface. |
| _____ | Identify the tasks the application needs to perform. |
| _____ | Identify the events required to trigger an object to perform its assigned tasks. |
- F. Using the "Val" operator calculate the total of three textbox input variables. Write down the appropriate codes. [1]
- G. Cranston Berries sells three types of berries: strawberries, blueberries, and raspberries. Sales have been booming this year and are expected to increase next year. The sales manager wants you to create an application that allows him to enter the projected increase (expressed as a decimal number) in berry sales for the following year. He will also enter the current year's sales for each type of berry. The application should display the projected sales total for each berry type. For example, if the projected increase in berry sales is .05 (the decimal equivalent of 5%) and the current sales amount for strawberries is \$25,000, the projected sales total of strawberries for the following year is \$26,250. Prepare a TOE chart ordered by task, and then rearrange the TOE chart so that it is ordered by object. Be sure to include buttons that allow the user to both clear and print the screen [3]

Question 2 – Using Variables and Constants**[9 Marks]**

- A. Explain the difference between Option Explicit, Option Strict, and Option Infer available in Visual Basic. [1]
- B. A procedure needs to store a salesperson's name and bonus amount (which may have decimal places). Write the appropriate Dim statements to declare the necessary procedure-level variables. [1]

- C. A procedure needs to store the name of a business, the number of its employees at the beginning of the current year, the number of new employees hired during the current year, the number of employees who left the business during the current year, and the number of its employees at the end of the current year. Write the appropriate Dim statements to declare the necessary procedure-level variables. [2]
- D. Refer to figure 1 to calculate the area of the shaded part. You can assume that the users are required to enter the Length, Width, and Radius. As for Pie, it should be declared as a constant within the program. Also, be sure to use TryParse method to convert the values entered through the textboxes and show the output in a label. [3]

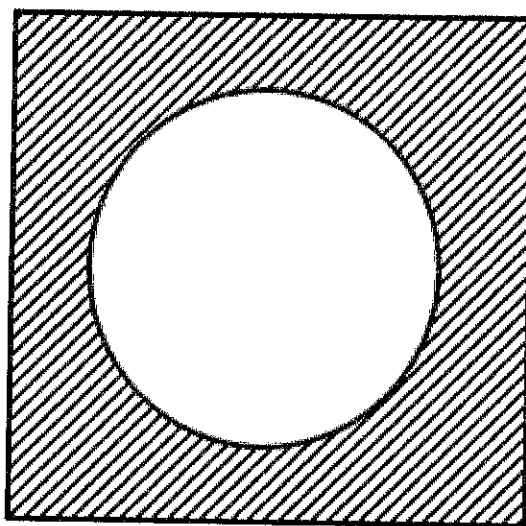


Figure 1: Area of Shaded Region

- E. Suppose there are three textboxes txtInput1, txtInput2, and txtInput3. Use the Val function to add the values entered in the three textboxes and show it in the lblOutput label. [1]
- F. Write a Private statement to declare a class-level variable named dblGrandTotal. [1]

Question 3 – The Selection Structure

[10 Marks]

- A. Write an If...Then...Else statement that displays the string "Please enter ZIP code" in the lblMsg control when the txtZip control does not contain any data. [1]
- B. Write an If...Then...Else statement that displays the string "Time to reorder" in the lblMsg control when the intInStock variable contains a number that is less than 250; otherwise, display the string "We have enough in stock". [1]
- C. Write the code for an application that displays a salesperson's monthly commission amount, given his or her monthly sales amount and commission ID. Salespeople who have one of the following commission IDs receive a 15% commission: A1, B2, C3. All other salespeople receive a 12% commission. [2]

- D. Write the code for an application that displays the result of dividing the larger of two numbers entered by the user by the smaller one, as indicated in Figure below. If the smaller number is 0, the application should display the message "Cannot divide by 0" in Quotient textbox. Test the application by entering 150.72 and 3 in the First and Second boxes, respectively. Then test it by entering 4 and 100 in the First and Second boxes, respectively. Also test it using 0 and 5, and then test it again using 0 and -3. Figure 2 shows how the application should appear. [3]

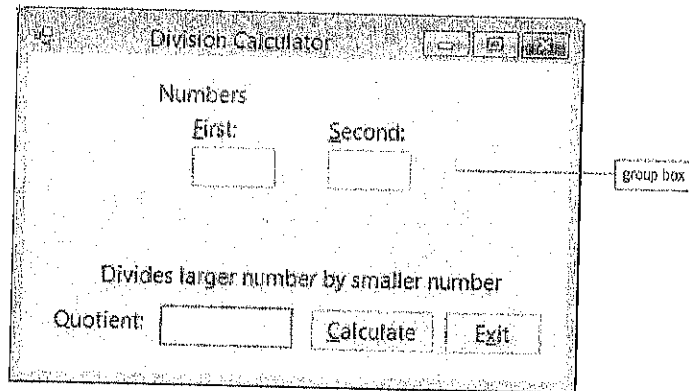


Figure 2: Division Calculator

- E. Sam's Paper Shoppe wants you to create an application that allows a salesclerk to enter an item's price and the quantity purchased by a customer. When the quantity purchased is greater than 5, the customer is given a 15% discount. The application should display the total amount the customer owes. Test the application using 10 and 5 as the price and quantity purchased, respectively; the total owed is \$50.00. Then test the application using 9 and 6 as the price and quantity purchased, respectively; the total owed is \$45.90. Assume that you have already designed the interface and now you are preparing to code. Write the entire applications code. [3]

Question 4 – More on the Selection Structure

[9 Marks]

- A. List the four errors commonly made when writing selection structures. Which errors produce the correct results but in a less efficient way? [1]
- B. Write the Visual Basic code that displays the message "Use the Kanton room" when the number of seminar participants is at least 75. When the number is 40 through 74, display the message "Use the Harris room". When the number is 10 through 39, display the message "Use the small conference room". When the number is less than 10, display the message "Cancel the seminar". The number of participants is stored in the `intParticipants` variable. Display the appropriate message in the `lblMsg` control. Code the multiple-alternative selection structure using the `If...Then...Else` statement. [2]
- C. Write series of codes that will allow users to calculate total price of Brazilian Tea, which sells both hot and iced tea in three different cup sizes. The figure provides radio buttons for selecting the cup size. The check box is used to specify whether the customer is ordering iced tea. The price for each cup size is shown in the interface; however, the store must also charge

a 4% sales tax. The Calculate button should calculate the total price of a cup of tea. It then should display (in the label control) a message that indicates the cup size, the total price, and whether the tea is hot or iced. Use the If...Then...Else statement to code the multiple-alternative selection structure. The CheckedChanged event procedures for the radio buttons and check box should clear the message from the label control. Refer to figure 3 below for illustration purposes. [3]

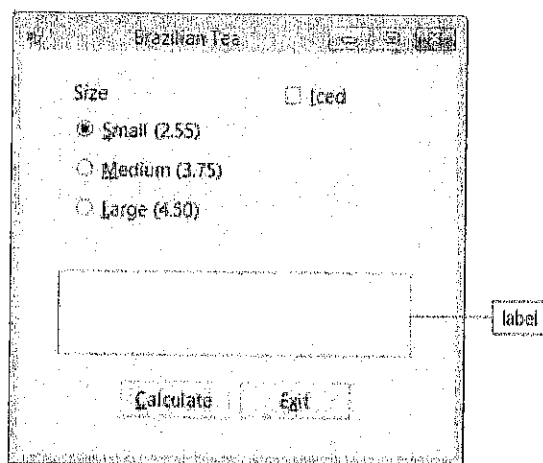


Figure 3: Brazilian Tea Application

- D. Write a **Select Case Statement** and an **If Selection Structure** for the following scenario where it checks the marks and prints out the appropriate grade in a label named lblOutput. Use this for reference: A+ (100 - 85), A (84 - 80), B+ (79 - 75), B (74 - 65), C+ (64 - 60), C (59 - 50), D (49 - 40), and E (39 - 0). [3]

Question 5 – The Repetition Structure

[10 Marks]

- A. Write a Pretest and Posttest Do Loop statements that prints out: [2]
0.07#, 0.05#, 0.03#, 0.01#, -0.01#,.
- B. Write a For Next Statement that prints out: [2]
5A01, 5A02, 5A03, 5A04, 5A05, 5A06, 5A07, 5A08, 5A09, 5A010,.
- C. Use repetition structures to come up with the same exact output using just one label to produce the output shown below: [3]
- ```
#####
%%%%%%%%%%
%%%%%%%%%%
#####
```
- D. Use repetition structures to come up with the same exact output using just one label to produce the output shown below: [3]

\$ \$ \$ \$ \$ \$  
 \$ \$ \$ \$ \$ \$  
 \$ \$ \$ \$ \$ \$  
 & & & & &  
 & & & & &  
 & & & & &

### Question 6 – Sub and Function Procedures

[9 Marks]

- A. Explain the difference between a Sub procedure and a Function procedure. [1]
- B. Write codes for the program shown in figure 4 which calculates an employees salary by selecting on the hours worked and rate using a list item. The IstHours control should display the number of hours worked from 1 to 60 in increments of 1. The IstRates control should display pay rates from 10.00 to 30.00 in increments of 0.5. The default selections in the IstHours and IstRates controls should be 40 and 10.00, respectively. The application should use a Sub procedure to calculate an employee's gross pay, which is based on the number of hours worked and the pay rate selected in the list boxes. However, employees receive double-time for hours worked over 40. Test the application appropriately. [3]

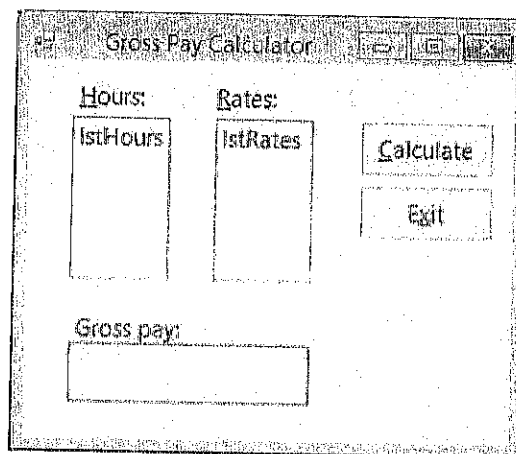


Figure 4: Gross Pay Calculator Application

- C. Explain the difference between a ListBox and a ComboBox. [1]
- D. Explain the difference between the terms SelectedItem and SelectedIndex. [1]
- E. Write the code for a Sub procedure named GetState. The procedure should prompt the user to enter the name of a U.S. state, storing the user's response in its strState parameter. Then write a statement to invoke the procedure, passing it the strName variable. [1.5]
- F. Write the code for a Sub procedure that receives a Double number passed to it. The procedure should multiply the number by 1.5 and then display the result in the lblAnswer control. Name the procedure IncreaseNum. Then write a statement to invoke the procedure, passing it the number 75.5. [1.5]

**Question 7 – String Manipulation****[8 Marks]**

- A. Write a Visual Basic statement that removes the leading and trailing spaces from the txtAddress control. [1]
- B. Write the Visual Basic statements to accomplish the following tasks: [2.5]
- I. In the lblSize control, display the number of characters contained in the strMsg variable.
  - II. Remove the leading and trailing spaces from the strState variable.
  - III. Use the Insert and Remove methods to change the contents of the strWord variable from "cater" to "critter".
  - IV. Use the Insert method to change the contents of the strWord variable from "day" to "Monday".
  - V. Change the contents of the strPay variable from "765.44" to "\*\*\*\*765.44".
- C. Using the Insert and Remove methods, write the Visual Basic statements to change the contents of the strWord variable from "late" to "crate". [1.5]
- D. Write the Visual Basic statement that uses the Contains method to determine whether the strAddress variable contains the string "Jefferson Street" (entered in uppercase, lowercase, or a combination of uppercase and lowercase). Assign the method's return value to a Boolean variable named blnIsContained. [2]
- E. Explain the difference between a menu item's access key and its shortcut keys. [1]

**Question 8 – Arrays****[10 Marks]**

- A. Write the statement to declare a procedure-level one-dimensional array named decOrders. The array should be able to store 50 decimals. Then write the statement to store the decimal number 2.50 in the tenth element. [2]
- B. The intNumbers array is a one-dimensional array. Write the statement to add together the numbers stored in the first and second array elements, displaying the sum in the lblSum control. [2]
- C. Write the statement to declare a class-level one-dimensional array named strCountries. The array should be able to store 100 strings. Then write the statement to store the string "New Zealand" in the first element and "Fiji" in the last element. [2]
- D. Write the statement to declare a procedure-level array named intBalances. The array should have seven rows and three columns. Then write the statement to store the number 100 in the element located in the third row, second column. [2]

- E. Write the statements that determine the highest row and highest column subscripts in the strTypes array. The statements should assign the subscripts to the intHighRow and intHighCol variables, respectively. [2]

**Question 9 – Classes and Objects**

**[9 Marks]**

- A. Explain how the computer determines the appropriate constructor to use when instantiating an object using a class that contains more than one constructor. [1]
- B. Write a Class statement that defines a class named Book. The class contains three Public variables: Title, Author, and Price. The Title and Author variables are String variables. The Price variable is a Decimal variable. Then declare a variable that can store a Book object; name the variable fiction. Also write a statement that instantiates the Book object and assigns it to the fiction variable. [2]
- C. Write a Class statement that defines a class named SongInfo. The class contains three Private String variables named \_strName, \_strArtist, and \_strSongLength. Name the corresponding properties SongName, Artist, and SongLength. Then create a Song object and assign it to a variable named hipHop. [2]
- D. Explain the difference between the private and public keyword. [1]
- E. Assume you are required to create an application and have designed an interface already, you are required to write codes for the Main form and as well as for a class. Modify the class to use Double (rather than Integer) variables and properties. Add a method named GetPerimeter to the Rectangle class. The method should calculate and return the perimeter of a rectangle. To calculate the perimeter, the method will need to add together the length and width measurements, and then multiply the sum by 2. (Hint: Using 120 feet as the length, 75 feet as the width, and 10 as the cost per linear foot of fencing, the installation cost is \$3,900.00.) Refer below figure 5 for illustration purposes: [3]

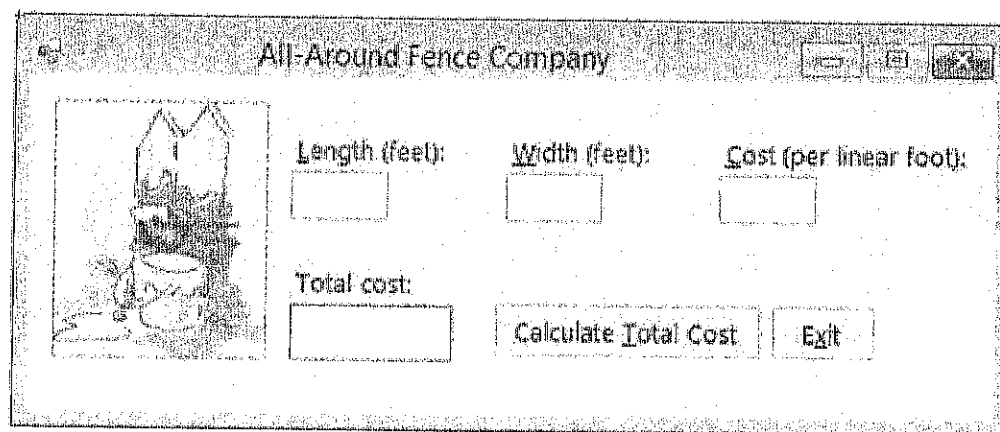


Figure 5: All-Around Fence Company

**Question 10 – Web Applications****[8 Marks]**

- A. Explain the following terms: [3]
- I. Brower
  - II. Web Server
  - III. Web Pages
  - IV. Client Computer
  - V. ASP
  - VI. Postback
- B. What name is automatically assigned to the first web page created in an empty web application? [1]
- C. Explain the terms Dynamic and Static when dealing with web pages. Give some examples of the mentioned types of web pages. [1]
- D. What is a HyperLink control and what can the users use it for? [1]
- E. Designing web pages can be a hard job to do, what is one way to organise all the controls and texts in a web page? [1]
- F. Explain the term “validation” when talking about web pages. List and describe three types of validators used with web pages. [1]

**Question 11 – Working with Access Database & LINQ****[9 Marks]**

- A. The tblBooks table contains five fields (BookNum, Title, Author, Price, QuantityInStock). The BookNum, Price, and QuantityInStock fields are numeric; the Title and Author fields contain text. The dataset's name is BooksDataSet. [6]
- I. Write a LINQ statement that arranges the records in ascending order by the Author field.
  - II. Write a LINQ statement that selects records having a price of at least \$12.75.
  - III. Write a LINQ statement that selects records having more than 100 books in inventory.
  - IV. Write a LINQ statement that selects the books written by George Marten and arranges the books in descending order by the book's price.
- B. Explain the term “Binding” in context to LINQ. [1]
- C. Explain what the following lines of code are doing: [2]

```
Dim records = From store In StoresDataSet.tblStores
 Where store.State.ToUpper Like strState & " "
 Select store
TblStoresBindingSource.DataSource = records.AsDataView
```

**THE END**

