



The University of Fiji

SCHOOL OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE / INFORMATION TECHNOLOGY

FINAL EXAMINATION SEMESTER 2, 2015

SOFTWARE DESIGN & PROGRAMMING

ITC 216

Time Allowed: Three hours (3 hours)

(An extra ten minutes is allowed for reading this paper)

INSTRUCTIONS

- 1.0 Write **all** your answers in the **Answer Book** provided.
- 2.0 There are nine (9) pages of questions in this Question Booklet (excluding the Cover Page)
- 3.0 Write your **Student Identification Number** on the front page of the **Answer Book**.
- 4.0 If you use extra sheets of paper, be sure to show clearly the question number(s) being answered and to tie each sheet securely in your Answer Book at the appropriate place.
- 5.0 There are **three** sections in this paper; **Section A** consists of 20 multiple choice and is worth 20 marks, **Section B** consists of 5 short answer questions and is worth 65 marks, **Section C** consists of 1 error handling question and is worth 15 marks. **Answer all questions.**
- 6.0 **Programmable calculators** are not allowed.

SECTION A – Multiple Choice Questions**(20 Marks)**

Write the question number and the letter representing the best answer in the answer booklet.

1. _____ is (are) the correct sequence of words and symbols that form the operating system's command set.
 - a. Syntax
 - b. An event
 - c. An action
 - d. Semantics
2. GUI components are often referred to as _____.
 - a. widgets
 - b. gadgets
 - c. wadgets
 - d. objects
3. A(n) _____ shows the relationship between screens in an interactive GUI program.
 - a. relationship diagram
 - b. relationship plan
 - c. interactivity diagram
 - d. interaction plan
4. A _____ class contains methods that allow you set physical properties such as height and width.
 - a. container
 - b. method
 - c. property
 - d. size
5. A(n) _____ is a notification from the operating system that an action, such as the user clicking the mouse or pressing a key, has occurred.
 - a. trigger
 - b. event
 - c. process
 - d. method
6. Event handlers are _____.
 - a. processes
 - b. methods
 - c. programs
 - d. references
7. Most of the classes used to develop Windows-based applications are organized in which namespace?
 - a. System
 - b. System.Windows.Forms
 - c. System.Windows
 - d. System.Forms
8. The _____ method of the Control class sets the input focus.
 - a. Select()
 - b. Focus()
 - c. Set()
 - d. Control()
9. Probably the most commonly used control for input and output is the _____.
 - a. Button
 - b. Label
 - c. TextBox
 - d. Menu

10. Double-clicking on the form when you are using the Form Designer brings up the Code Editor and also _____.
a. creates a syntax error
b. registers a double click event
c. runs the application
d. adds a form load method heading
11. After a button click event is registered, the associated method is called _____.
a. using the keyword this.
b. using the object name for the form.
c. using the object name for the button.
d. automatically when the button is clicked.
12. A _____ control offers the advantage of multiple selections and the opportunity to add or remove items dynamically at runtime.
a. Button
b. TextBox
c. ListBox
d. Label
13. Double-clicking on the ListBox control _____.
a. registers the SelectedIndexChanged event as being of interest
b. registers the Click event as being of interest
c. registers the DoubleClick event as being of interest
d. registers the ItemChanged event as being of interest
14. The default event-handler method for the ListBox and ComboBox control is _____.
a. KeyPress()
b. SelectedIndexChanged()
c. Click()
d. Changed()
15. You can add a shortcut to a menu by preceding the character with a(n) _____. This places an underline under the next character typed.
a. underscore (_)
b. hyphen (-)
c. ampersand (&)
d. asterisk (*)
16. With a ListBox of numbers, the SelectedItem property returns _____.
a. the one selected in an int or double format
b. an object representing the one selected
c. a string representing the one selected
d. the index of the one selected
17. The _____ is a standard way to specify, construct, and document systems that use object-oriented methods.
a. UMR
b. UML
c. UVS
d. VML

18. _____ emphasize the flow of control and data among the things in the system being modeled.
- a. Interaction diagrams
 - b. Sequence diagrams
 - c. Structure diagrams
 - d. Behavior diagrams
19. The actual use cases in a use case diagram are represented by _____.
- a. triangles
 - b. squares
 - c. ovals
 - d. stick figures
20. In the UML, a _____ block is called a protected node.
- a. throw
 - b. try
 - c. sent
 - d. catch

SECTION B – Short Answer Questions

(65 Marks)

All questions in this section are compulsory.

Question 1 – Introduction to C# Programming & User Interface Design

- A. When writing a C# application, you follow three-step process for planning the project and then repeat the three-step process for creating the project. What are the 3 steps for Planning list and describe them? What are the 3 steps for Programming list and describe them? **(2 Marks)**
- B. You have already seen errors as you create sample projects. Programming errors come in three varieties, list and define them. What do you mean by Debugging? **(2 Marks)**
- C. Write the statements to clear the text box called employeeFirstNameTextBox and reset the insertion point into the box. **(1 Mark)**
- D. What is a ToolTip? How can you make a ToolTip appear? **(1 Mark)**

Question 2 – Variables, Constants, and Calculations & Decisions and Conditions

A. Indicate whether each of the following identifiers confirms the rules of C# and to the naming conventions. If the identifier is invalid, indicate that it is "Invalid", give a reason and if it is valid just indicate "Valid". **(2 Marks)**

- I. companyNameString
- II. #SoldInteger
- III. Text
- IV. minimumRate
- V. maximumCheckDecimal
- VI. amount\$Decimal
- VII. omitted
- VIII. maximum

B. Differentiate between a Named Constant and an Intrinsic Constant. **(1 Mark)**

C. Write the declaration for the following situations, make up appropriate variable identifiers. **(3 Marks)**

- I. You need variables for payroll processing to store the following:
 - Number of hours, which can hold decimal value.
 - Employee's name.
 - Department number (not used in calculations).
- II. You need variables for inventory control to store the following:
 - Description of the item.
 - Part number.
 - Selling price.

D. What will be the result of the following calculations using the order of precedence? **(2 Marks)**

- I. $yInteger * xInteger + zInteger * 2$
- II. $yInteger * (xInteger + zInteger) * 2$
- III. $(yInteger * xInteger) + zInteger * 2$
- IV. $((yInteger * xInteger) + zInteger) * 2$

E. Determine which Boolean expression will evaluate *true* and which ones will evaluate *false*.

Count1Integer	count2Integer	count3Integer	word1TextBox.Text	word2TextBox.Text
5	5	-5	"Bit"	"bit"

- I. count1Integer != count2Integer
- II. count1Integer + 2 > count2Integer + 2
- III. word1TextBox.Text == word2TextBox.Text
- IV. word1TextBox.Text != ""
- V. word1TextBox.Text == "bit"
- VI. "2" != "Two"
- VII. '\$' <= '?'
- VIII. word1TextBox.Text.CompareTo(word2TextBox.text) > 0

(4 Marks)

F. Write the *switch* statement to convert this *if* statement to a *switch* statement: (2 Marks)

```

if (countInteger == 0)
{
    MessageBox.Show ("Invalid value");
}
else
{
    averageDecimal = sumDecimal / countInteger;
    MessageBox.Show ("The average is: " +
averageDecimal.ToString( ));
}

```

Question 3 – Menus, Common Dialog Boxes, and Methods & Multiform Projects

A. You need to write a method to calculate and return the average of three decimal values.

- I. Write the header line of the method.
- II. Write the calculation.
- III. How is the calculated average passed back to the calling method?

(3 Marks)

B. Explain the difference between a menu and a submenu.

(1 Mark)

C. Code the necessary statements to produce a color dialog box and use it to change the background color of a label.

(4 Marks)

D. Name at least three types of common dialog boxes.

(1.5 Marks)

- E. What is the purpose of a property method? (1 Mark)
- F. Write the statement to assign the private variable `drinksSoldInteger` to the `DrinksSold` property of `aSummaryForm`. (2 Marks)
- G. Write the property *set* method for `DrinksSold`. (3 Marks)
- H. How does the *Show* method differ from the *ShowDialog* method? (2 Marks)

Question 4 – Lists, Loops and Printing & Arrays

- A. Describe the purpose of each of the following methods or properties for a list box or combo box control. (5 Marks)
- I. `Sorted`
 - II. `SelectedIndex`
 - III. `Items`
 - IV. `DropDownStyle`
 - V. `Items.Count`
 - VI. `Items.Add`
 - VII. `Items.Insert`
 - VIII. `Items.Clear`
 - IX. `Items.RemoveAt`
 - X. `Items.Remove`
- B. Identify the statements that are correctly formed and those that have errors. For those errors, state what is wrong and how to correct it. You can assume that all variables are wrong and how to correct it. (4 Marks)
- I. `for ( indexInteger = 0; indexInteger < -10; indexInteger -=1 )`
 - II. `for ( indexInteger = 100; indexInteger > 0; indexInteger -= 25 )`
 - III. `for ( 4 = 1; 4 < 10; 4 += 2 )`
 - IV. `for ( indexInteger = beginInteger; incrementInteger < endInteger; incrementInteger++ )`
- C. Explain the differences between a *do* and a *while* loop. Also write the loops general form. (3 Marks)

D. Define the following terms:

(2.5 Marks)

- I. Array
- II. Element
- III. Subscript
- IV. Index
- V. Subscripted variables

E. How can you initialize values in a two-dimensional array?

(2 Marks)

F. Write a *struct* statement to hold student data, which contains last name, first name, student id, number of units completed, and GPA. The new structure should be called "Students".

(2 Marks)

Question 5 – Web Applications, Database Applications & Object-Oriented Programming

A. What is the difference between an ASP.NET server control and an HTML control? When might you want to use each type?

(2 Marks)

B. Name and describe the four types of websites.

(2 Marks)

C. Some database objects are known as Binding Source, Table Adapter, Dataset and Binding Navigator. Explain what each of those terminologies means.

(2 Marks)

D. Key features of an object-oriented language are encapsulation, inheritance, and polymorphism. Describe them each in detail with examples to support your answer.

(3 Marks)

SECTION C – Error Handling Questions**(15 Marks)**

There is only 1 error handling question in this section. For this question you are required to write down the line number where the error is located, what the error is and rewrite the code in correct format.

```
1. using System.Start;
2. using System.Collections.Generic;
3. using System.ComponentModel;
4. using System.Data;
5. using System.Drawing;
6. using System.Text;
7. using System.Windows.Forms;
8. namespace Ch03ClothingSales
9. {
10.     public partial class ClothingSalesForm : Form
11.     {
12.         // Declare the constant and summary variables.
13.         private const decimal DISCOUNT_RATE_Decimal = 0.3n;
14.         private decimal totalAmountDecimal;
15.         Private string int numberTransactionsInteger;
16.         public ClothingSalesForm()
17.         {
18.             InitializeComponent();
19.         }
20.         private void calculateButton_Click(object sender, EventArgs e).toString()
21.         {
22.             // Calculate the sale, discount, and summary values.
23.             // Declare the variables.
24.             int quantityInteger;
25.             decimal priceDecimal, extendedPriceDecimal, discountDecimal,
26.             amountDueDecimal;
27.             try()
28.             {
29.                 // Convert input values to numeric and assign to variables.
30.                 quantityInteger = int.Parse(quantityTextBox.Text);
31.                 try()
32.                 {
33.                     priceDecimal = decimal.Parse(priceTextBox.Text);
34.                     // Calculate values.
35.                     extendedPriceDecimal = quantityInteger * priceDecimal;
36.                     discountDecimal = Decimal.Round(
37.                     (extendedPriceDecimal * DISCOUNT_RATE_Decimal), 2);
38.                     amountDueDecimal = extendedPriceDecimal - discountDecimal;
39.                     totalAmountDecimal += amountDueDecimal;
40.                     numberTransactionsInteger++;
41.                     // Format and display answers.
42.                     extendedPriceTextBox.Text = extendedPriceDecimal.ToString("C");
43.                     discountTextBox.Text = discountDecimal.ToString("N");
44.                     amountDueTextBox.Text = amountDueDecimal.ToString("C");
45.                     // Format and display summary information.
46.                     totalAmountTextBox.Text = totalAmountDecimal.ToString("C");
47.                     numberTransactionsTextBox.Text =
48.                     numberTransactionsInteger.ToString();
49.                 }
50.             } catch(Final)
51.             {
52.                 // Invalid price.
53.                 MessageBox.Show("Invalid price.", "Data Error");
54.                 priceTextBox.Focus();
```

```

55.             priceTextBox.SelectAll();
56.         }
57.     }
58.     catch()
59.     {
60.         // Invalid quantity.
61.         MessageBox.Show("Invalid quantity.", "Data Error");
62.         quantityTextBox.Focusing();
63.         quantityTextBox.SelectAll();
64.     }
65. }
66. private void clearButton_Click(object sender, EventArgs e)
67. {
68.     / Clear the text boxes.
69.     quantityTextBox.Clear().ConvertToString();
70.     priceTextBox.Clear();
71.     discountTextBox.Clear();
72.     extendedPriceTextBox.Clear();
73.     amountDueTextBox.Clear();
74.     quantityTextBox.Focus();
75. }
76. private void exitButton_Click(object sender, EventArgs e)
77. {
78.     // End the program.
79.     this.Exit();
80. }
81. }
82. ]

```

THE END