You must fill in your roll number in the space on the right before starting the exam.

Course Title: Introduction to Computing
Course Code: CS101
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Exam: Final
Quarter: Autumn
Academic Year: 2006-2007
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Time Allowed: 120 minutes
Total Marks: 95 (35% of grade)

DO NOT OPEN THIS EXAM UNTIL TOLD TO DO SO.

The instructions below must be followed strictly. Failure to do so can result in serious grade loss.

⇒ You may not
  • talk to anyone once the exam begins.
  • leave the examination room and then return.
⇒ Keep your eyes on your own paper.
⇒ Read all questions very carefully before answering them.

Specific instructions:
1. Closed book / closed notes / no help sheet / Calculator & mobile phone not allowed
2. All answers are to be marked on the separate answer sheet
3. This exam booklet contains 14 printed pages including this cover. You may use blank spaces on this exam booklet for rough work. However, do not put any stray marks on the answer sheet.
4. Leaving an answer blank will result in zero points. There will be negative marking for wrong answers. The implication of negative marking is that if you have no idea about the appropriate choice for a question, leave it blank. However, if you can eliminate some choices, it is better to guess from the remaining answers. Every wrong answer will earn -1/4 times the points for that question.
Section 1 (Questions 1-18): 2.5 points per question. Total points for this section are 45

1. Which one of the following is the least appropriate description of computer science?
   a. Computer Science is the discipline that teaches us how to write programs to perform complex tasks on a computer.
   b. Computer Science is primarily concerned with the study of discovery of algorithms, which are steps or procedures for solving computational problems.
   c. Computer Science should really be called 'Computing Science' because it deals more with the art and science of computation, rather than with the physical 'computer' itself.
   d. Computer Science is the study of computation as well as computer technology, including both hardware and software.
   e. Computer science is the study of the theoretical foundations of information and computation and their implementation and application in computer systems.

2. Which one of the following is one of the primary responsibilities of a systems analyst?
   a. Managing the Quality Assurance (QA) process, to ensure that black box or white box testing is properly carried out.
   b. Supervising teams of software programmers, to ensure that their code meets the client's requirements.
   c. Ensuring that the software is properly documented and all user manuals follow documentation standards.
   ✔️ d. Preparation of a Software Requirement Specification (SRS) document, which contains the requirements of the software from the client's perspective.
   e. Ensuring that the Database Management System (DBMS) is designed such that there are no concurrency issues, so that simultaneous transactions do not result in problems.

3. Which one of the following cannot be an example of an 'embedded system'?
   a. Traffic Light controller
   b. Network Router
   c. Laptop computer
   d. Digital Camera
   e. Automatic Teller Machine (ATM)
4. Which one of the following number sequences ranks the jobs in a typical software company in the descending order of seniority (i.e. from most senior down to most junior)
   I. System Analyst
   II. Computer and Information Systems Manager
   III. Computer Programmer
   
   a. I, II, III
   b. II, III, I
   c. II, I, III
   d. III, I, II
   e. III, II, I

5. A small piece of code made available by the manufacturer to remove a particular defect from the software is known as:
   a. freeware
   b. upgrade
   c. bug
   d. patch
   e. release

6. Consider the following list of actions
   I. Your friend has MS Office installed on his personal computer. You borrow the CDs from him to install the same software on your computer.
   II. The network department buys one license of Adobe Photoshop, and installs it so that it can be used by any user in the computer lab.
   III. You download software categorized as 'freeware', install it yourself and allow your friends to copy it too.
   IV. You download software categorized as 'shareware', install it yourself and allow your friends to copy it too.
   V. You get the CDs of the 'evaluation version' of MATLAB, and before buying the full version, you allow your friends to copy the evaluation version on their computers.
   
Which of the above actions are considered software piracy?
   a. All of them
   b. All except III and IV
   c. All except II and III
   d. I only
   e. I and II only
7. The capacity of a transmission channel is measured in:
   a. bytes
   b. bits per meter
   c. bits per second
   d. meters per second
   e. megahertz

8. Which one of the following is not an example of communication over a guided transmission medium:
   a. twisted pair cable
   b. wireless channel in the corridor of a building
   c. fiber optic cable
   d. digital subscriber line (DSL)
   e. coaxial cable

9. A web server is an example of a
   a. software application running on a server
   b. hardware machine acting as a server
   c. webpage 'served' by a server
   d. intranet
   e. network router connected to a server
10. Which one of the following depicts a 'ring' topology network

a.

b.

c.

d.

e.

11. A router in the Internet forwards packets using which of the following protocols?
   a. HTTP
   b. TCP
   c. [IP]
   d. TCP/IP
   e. FTP
12. A Domain Name Server (DNS) returns the
   a. address of the next router hop in the Internet
   b. URL of the desired web site
   c. IP address of the web server
   d. IP address of the computer running the web server
   e. contents of the web page in HTTP format

13. If we increase the bandwidth provided by our ISP to LUMS, which of the following will be true?
   a. The transmission delay will increase
   b. The latency will decrease
   c. The latency will remain the same
   d. The propagation delay will increase
   e. The propagation delay will decrease

14. An image of higher resolution will appear
   a. larger on the screen but smaller when printed
   b. larger on the screen and larger when printed
   c. smaller on the screen and same size when printed
   d. larger on the screen and same size when printed
   e. same size on the screen and smaller when printed

15. The hard disk is a data storage device that contains tracks and sectors. The tracks on a hard disk
    are arranged in concentric circles, with each track divided into several sectors. The sectors at the
    outer end are longer than the sectors on the inner side.

    Which of the following is true about the tracks and sectors on a CD-ROM?
    a. The tracks and sectors on a CD are similar in arrangement to those on a hard disk
    b. A CD does not contain any tracks, and has only sectors
    c. A CD has only one long track, and its sectors are of the same size throughout.
    d. A CD has only one long track, but its sectors are similar to those on a hard disk, i.e., larger
      on the outer side than the inner side.
    e. The tracks on a CD are similar to those on a hard disk, but the sectors are of the same size
      on each track, regardless of its position.
16. Which one of the following is not directly plugged on the mother-board?
   a. hard-disk
e. random access memory (RAM)
   b. clock crystal
d. micro-processor
c. read-only memory (ROM)

17. If I cannot open applications which require a large amount of memory on my computer, which of the following are valid remedies to this situation?
   I. increase the size of virtual memory
   II. increase the size of cache memory
   III. increase the size of random-access memory (RAM)
   IV. increase the size of hard-disk
   V. increase the bandwidth of the internet connection
   a. All of them
   b. I and III
   c. I, II and III
   d. All except V
   e. III only

18. Which of the following is true with reference to RISC and CISC processors
   I. RISC processors have lesser number of instructions in their instruction set
   II. RISC processors are generally faster than CISC processors
   III. Most servers typically use a RISC architecture
   a. I only
   b. I and II only
   c. II and III only
   d. I, II and III
   e. II only
Section 2 (Questions 19-28): Total points for this section are 50

In this section, code snippets are shown and you are asked questions about them. You may assume that other subroutines are appropriately defined, and you are only seeing a portion of the code.

19.

Function f(a, b, c)
    a = b + c
    b = c + a
    f = a + b
End Function

What is the formula for the value of f(a, b, c) in terms of the values of parameters a, b and c that are passed to the function.

a. f = a + b
b. f = a + b + c
c. f = 2a + 2b + 2c
d. f = a + b + 2c
   e. f = 2b + 3c

20. The value printed by the following code snippet would be:

    s = 3
    For x = 3 To 10 Step 4
        s = s + 4
    Next x
    Form1.print s

    a. 0
    b. 3
    c. 7
    d. 10
    e. 11
Sub Skyline()
    Form1.Line (5000, 5000)-(1000, 1000), , B
    Randomize
    r = 1000
    For i = 1000 To 5000 Step 500
        Form1.Line -(i, r)
        r = 1000 + Rnd * 4000
        Form1.Line -(i, r)
    Next i
    End Sub

Note: Form1.Line - (x, y) draws a line starting from where the last line that was drawn ended, to point (x, y). So Form1.Line (x0, y0)-(x1, y1), followed by Form1.Line -(x2, y2), would draw two lines: One from (x0, y0) to (x1, y1), and a second from (x1, y1) to (x2, y2).

The Skyline routine above can draw which one of the following pictures.
A function is to be written for the following game:

- Two dice are to be rolled.
- If both the dice have the same number, you lose (so function returns a -1).
- If they are different by one, you win (so function returns a +1).
- Otherwise it is a draw (so function returns a 0).

Which of the following code snippets implements this game?

[Note: the shaded parts of code are identical in all the five options]
Private Sub Command1_Click()
    Command1.Enabled = False
    Command2.Enabled = True
End Sub

Private Sub Command2_Click()
    Command1.Enabled = True
    Command2.Enabled = False
End Sub

A form has two command buttons, and the following code. The button would behave very similarly to which other control?

a. Frames  
b. Text Boxes  
c. Check Boxes  
  d. Option Buttons  
e. Labels

24.

Consider the figure shown below. Which of the following code snippets would produce it?

a. 
   For x = 8000 To 2000 Step -2000
       Form1.Circle (5000,x),(10000-x) / 10
   Next x

b. 
   For x = 2000 To 8000 Step 2000
       Form1.Circle (x, 5000), x / 10
   Next x

c. 
   For x = 8000 To 2000 Step -2000
       Form1.Circle (5000, x), x / 10
   Next x

d. 
   For x = 2000 To 8000 Step 2000
       Form1.Circle (x, 5000), (10000 - x) / 10
   Next x

e. 
   For x = 2000 To 8000 Step 2000
       Form1.Circle (10000 - x, x), x / 10
   Next x
25. Which of the following diagrams would be produced by the following code?

Private Sub Form_Load()
Form1.AutoRedraw = True
Form1.DrawWidth = 3
For x = 8000 To 2000 Step -2000
Form1.Circle(x, 19000-x), x/10
Next x
End Sub

![Diagrams a, b, c, d, e]

26. The program on the right intends to create an up/down counter similar to the one you encountered in yesterday's Lab Exam. The initial caption of the command button is "0" and each click of the command button results in the caption being updated. What is the exact sequence seen on the command button:

- a. 0 1 2 ... 9 10 11 ...
- b. 0 0 0 ...
- c. 0 1 1 1 ...
- d. 0 1 2 3 ... 10 9 8 ...
- e. 0 1 2 3 ...

![Code and Image]
27. Which of the following code snippets would produce `z` concentric squares at a Mouse Down location \((X, Y)\). The dimensions of the inner most square are 100x100 twips and each successive square’s side increases by a 100 twips.

a. 
   For \(i = 1 \text{ To } z\)  
     Line \((X, Y)-(X+100 \times i/2, Y+100 \times i/2), \) vbRed, B 
   Next \(i\)

b. 
   For \(i = 1 \text{ To } z\)  
     Line \((X-100 \times i, Y-100 \times i)-(X+100 \times i, Y+100 \times i), \) vbRed, B 
   Next \(i\)

c.  
   For \(i = 1 \text{ To } z\)  
     Line \((X-100 \times i/2, Y-100 \times i/2)-(X+100 \times i/2, Y+100 \times i/2), \) vbRed, B 
   Next \(i\)

d. 
   For \(i = 1 \text{ To } z\)  
     Line \((X-100 \times i, Y+100 \times i)-(X+100 \times i, Y+100 \times i), \) vbRed, B 
   Next \(i\)

e. 
   For \(i = 1 \text{ To } z\)  
     Line \((X, Y)-(X-100 \times i/2, Y-100 \times i/2), \) vbRed, B 
   Next \(i\)
28. Which of the following snippets of code will resize a Form by 'Expanding' or 'Shrinking' it vertically while drawing 'Z' rectangles in one column? Each rectangle has a width of 1000 twips and a height of 2000 twips and there is a gap of 100 twips between each rectangle as well as the edges of the drawing area.

a.```
Form1.Cls
    diff = Form1.Width - Form1.ScaleWidth
    recHeight = 1000
    innerHeight = recHeight * Z + (Z + 1) * 100
    Form1.Height = innerHeight + diff
    For i = 1 To Z
        Line(100, i * 100 + (i - 1) * recHeight) - (2100, i * 100 + i * recHeight), vbRed, B
    Next i
```n
b.```
Form1.Cls
    diff = Form1.Height - Form1.ScaleHeight
    recHeight = 2000
    innerHeight = recHeight * Z + (Z + 100)
    Form1.Height = innerHeight + diff
    For i = 1 To Z
        Line(100, i * (100 + recHeight)) - (1100, i * 100 + i * recHeight), vbRed, B
    Next i
```n
c.```
Form1.Cls
    diff = Form1.Height - Form1.ScaleHeight
    recHeight = 2000
    innerHeight = recHeight * Z + (Z + 1) * 100
    Form1.Height = innerHeight + diff
    For i = 1 To Z
        Line(100, i * 100 + (i - 1) * recHeight) - (1100, i * 100 + i * recHeight), vbRed, B
    Next i
```n
d.```
Form1.Cls
    diff = Form1.Width - Form1.ScaleWidth
    recHeight = 2000
    innerHeight = recHeight * Z + (Z + 1) * 100
    Form1.Height = innerHeight + diff
    For i = 1 To Z
        Line(100, i * 2000 + (i - 1) * recHeight) - (2100, i * 100 + i * recHeight), vbRed, B
    Next i
```n
e.```
Form1.Cls
    diff = Form1.Height - Form1.ScaleHeight
    recHeight = 2000
    innerHeight = recHeight * Z + (Z + 1) * 100
    Form1.Height = innerHeight + diff
    For i = 1 To Z
        Line(100, i * 100 + (i - 1) * recHeight) - (1100, i * 100 + i * recHeight), vbRed, B
    Next i
```