



THE UNIVERSITY OF THE WEST INDIES

Semester I ☒ Semester II ☐ Supplemental/Summer School ☐

Examinations of December ☒ April/May ☐ July ☐ 2013

Originating Campus: Cave Hill ☐ Mona ☒ St. Augustine ☐ Open ☐

Mode: On Campus ☒ By Distance ☐

Course Code and Title: **COMP2190 – Net Centric Computing**

Date: **December 18, 2013**

Time: **9 am**

Duration: **2 Hours**

Paper No: **1**

Materials required:

Answer booklet: Normal ☒ Special ☐ Not required ☐

Calculator: Programmable ☐ Non-Programmable ☒ Not required ☐
(where applicable)

Multiple Choice

answer sheets: numerical ☐ alphabetical ☐ 1-20 ☒ 1-100 ☐

Auxiliary/Other material(s): None

Instructions to Candidates: This paper has 7 page(s) and 5 questions

Candidates are reminded that the examiners shall take into account the proper use of the English Language in determining the mark for each response.

Answer all questions in Section 1 and any two (2) from Section 2.

The maximum number of marks you may earn for the entire paper is **50**. The number in [] by each question indicates the number of marks allotted to the question. Justify all your answers; full credit will be given only for properly supported answers, partial credit will be given where applicable. Some useful information is provided on the last page for your reference.

Please write legibly and keep your answers concise. Points will be deducted for correct answers that also include incorrect or irrelevant information. Good skill!

NB: This paper may not be removed from the examination room.

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INSTRUCTIONS: Each page must be signed by the First and Second Examiners, and where applicable the University and External Examiners. Completed forms should be handed to the Assistant Registrar (Examinations). Where applicable, the EXTERNAL EXAMINER is requested to sign the question paper and return it with comments, if any, (on a

Section 1

Question 1 10 multiple choice sub-questions [10]

Question 2 [20]

- a. (i) Both UDP and TCP use port numbers to identify the destination entity when delivering a message. Give two reasons why these protocols invented a new abstract ID (port numbers), instead of using process IDs, which already existed when these protocols were designed. [2]
- (ii) Suppose that we want to change the IP address of `cypress.weatherby.cm` from 200.12.64.4 to 200.12.64.5. We change this mapping in the DNS authoritative name server for `cypress.weatherby.cm`. Once this mapping is changed in the authoritative name server, will all future references (generated anywhere in the Internet) to `cypress.weatherby.cm` be sent to 200.12.64.5? Explain your answer very briefly. [2]
- b. Does the Internet checksum always detect errors in the transmitted segment? Explain your answer in a sentence or two. [4]
- c. Suppose there are two ISPs providing WiFi access in a particular café, with each ISP operating its own AP and having its own IP address block. Further, suppose that by accident, each ISP has configured its AP to operate over channel 11. Will the 802.11 protocol completely break down in this situation? Discuss what happens when two stations, each associated with a different ISP, attempt to transmit at the same time. [4]
- d. What are the differences between message confidentiality and message integrity? Can you have confidentiality without integrity? Can you have integrity without confidentiality? Justify your answer. [4]
- e. (i) Write XHTML for a link element that displays the text “Click here” and has a target URL that uses the HTTP scheme with host name “`www.abc.edu.jm`”, hierarchical portion “`/level/3/courses`”, and a query value: “`discipline`” with value “`comp`”. [2]
- (ii) Indicate whether the following statement is True or False, AND explain your answer. “HTML allows constructs that are not permitted in XHTML” [2]

OVER...

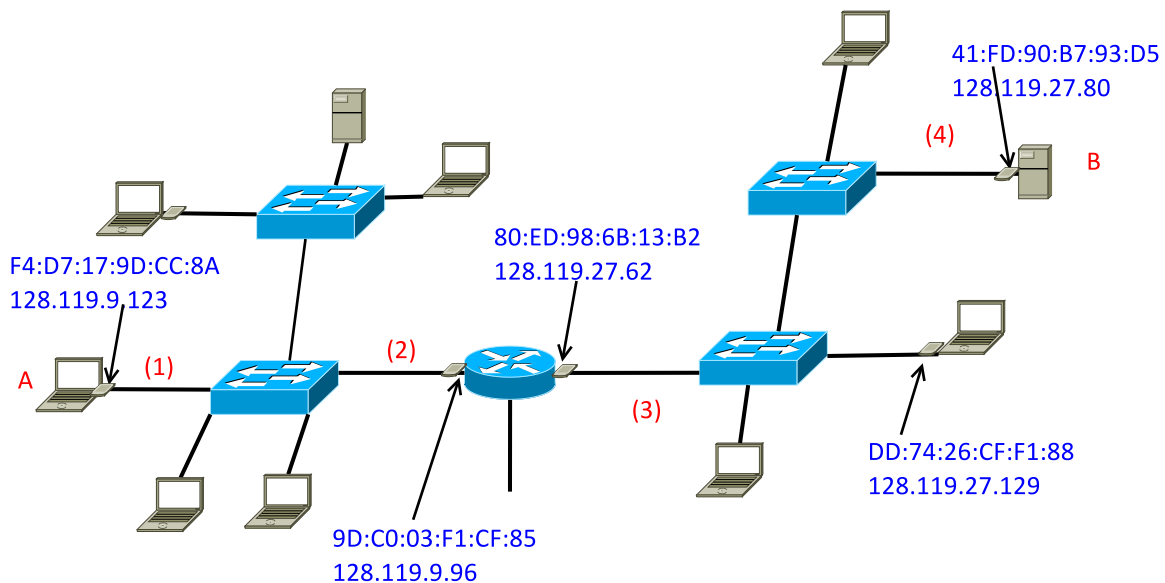
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Section 2

Question 3 [10]

Consider Fig. 3 below. The IP and MAC addresses are shown for nodes A, B, C and D, as well as for the router's interfaces. Suppose that server C is running an HTTP server, and node A is running a web browser. Consider an IP datagram being sent from node A to node C. This datagram contains a TCP segment which holds an HTTP GET message for some object on node C. Give the source and destination Ethernet addresses, as well as the source and destination addresses of the IP datagram encapsulated within the Ethernet frame at points (1), (2), (3), and (4) in Fig. 3. You should also provide the source and destination port numbers for the TCP segment. [10]



Question 4 [10]

- Indicate whether the following statement is True or False, AND explain your answer. "Consider sending a stream of packets from Host A to Host B using IPsec. Typically, a new SA will be established for each packet in the stream." [2]
- Consider RSA with $p = 11$ and $q = 13$
 - What are n and $\phi(n)$ (same as z)? [1]
 - Let $e = 19$. Why is this an acceptable choice for e ? [2]
 - Find d such that $de \bmod \phi(n) = 1$ and $d < \phi(n)$. [3]
 - Can you encrypt the message $m = 255$ using the key (n, e) . Justify your answer. [2]

OVER...

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Question 5 [10]

- a) Write PHP code that processes the following form:

```

1      <form action="q5.php" method="post">
2          <fieldset>
3              Discipline <input type="text" name="disc" id="crsDisc"> <br />
4              Code <input type="text" name="crsCode" id="crsCode"> <br />
5              Title <input type="text" name="crsTitle" id="crsTitle"> <br />
6              <input type="submit" />
7          </fieldset>
8      </form>

```

Your code should examine the discipline, course code, and title submitted and verify that they are valid. Valid disciplines and course codes are each four characters long. A valid course title is any non-empty string. Your PHP code's output should be a level-1 heading stating whether the data was valid or invalid, and a paragraph containing the data itself separated by commas.

[6]

- b) Describe two ways in which CSS allows for code reuse.

[2]

- c) Suppose the
- `crsCode`
- field contains 0219. What will the following JavaScript function do?
- [2]**

```

1      function testInput() {
2          var crsCode = document.getElementById("crsCode");
3          var codeVal = crsCode.value;
4          if ( codeVal!='' && ((codeVal-codeVal) == 0)
5              && codeVal.length == 4) {
6              crsCode.style.backgroundColor = "white";
7              return true;
8          }
9          else {
10             crsCode.style.backgroundColor = "red";
11             return false;
12         }
13     }

```

OVER...

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Useful Information

Algorithm 1 Extended_Euclidean(m, n)

```

( $A_1, A_2, A_3$ )  $\leftarrow$  ( $1, 0, m$ )
( $B_1, B_2, B_3$ )  $\leftarrow$  ( $0, 1, n$ )
while true do
  if  $B_3 == 0$  then
    return  $A_3$  {//No inverse}
  end if
  if  $B_3 == 1$  then
    return  $B_2$  {// $B_2 \equiv n^{-1} \pmod{m}$ }
  end if
   $Q \leftarrow \left\lfloor \frac{A_3}{B_3} \right\rfloor$ 
  ( $T_1, T_2, T_3$ )  $\leftarrow$  ( $A_1 - Q \times B_1, A_2 - Q \times B_2, A_3 - Q \times B_3$ )
  ( $A_1, A_2, A_3$ )  $\leftarrow$  ( $B_1, B_2, B_3$ )
  ( $B_1, B_2, B_3$ )  $\leftarrow$  ( $T_1, T_2, T_3$ )
end while

```

END

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