1712E1562   Candidate's Seat No : _____

M.Tech.-1 (N. & C.) + (Web. Tech.) Examination
Design and Analysis of Algorithm

Time : 3 Hours]   December 2018.   [Max. Marks : 100

Note : (1) Write both the sections in the separate answer books
   (2) Figures to the right indicate full marks
   (3) Make necessary assumptions wherever necessary

SECTION-I

Q.1 (a) Give answers to the following in one- two sentences (Any three):   [9]
   (i) How are the shortest-path and traveling-salesman problems similar and how are they different?
   (ii) What are the basic steps in substitution method to solve recurrences?
   (iii) Show that f(n) is $O(g(n))$ if and only if g(n) is $\Omega(f(n))$.
   (iv) When does worst case occur for INSERTION-SORT ? What is time complexity in this case?

   (b) Suppose we are comparing implementation of insertion sort and   [9]
   merge sort on the same machine. For inputs of size n, insertion sort
   runs in $8n^2$ steps, while merge sort runs in $64n \lg n$ steps. For which
   values of n does insertion sort beat merge sort?

Q.2 (a) Show that $n^3 + 4n^2 + 10n + 7$ is $\Theta(n^3)$. Is $2^{n+1} = O(2^n)$? Justify.   [8]
   (b) Illustrate the operation of merge sort on the array   [8]
   $A = <3, 41, 52, 36, 38, 57, 9, 49>$.

OR

Q.2 (a) Write the pseudo code of INSERTION-SORT and do best case   [8]
   analysis.

   (b) A recursive algorithm works by solving two half-sized problems   [8]
   recursively, with an additional linear-time overhead. Use the master
   method to give tight asymptotic bounds for the recurrence.

Q.3   Attempt the following (Any Two):   [16]
   (a) Fill in the blanks (Any Eight)   [8]
      1. Loop invariant property is used for ------

      2. Index of parent in a heap : PARENT(i) is -------

      3. Index of left child in a heap : Left(i) is -------

      4. Index of right child in a heap : Right (i) is -------

      5. Min-heap property is -----

P. T. O.

6. Max-heap property is ------

7. Largest element in max-heap is at the -------

8. Max no of elements in a heap of height h is -------

9. If $\lim_{n \to \infty} \frac{f(n)}{g(n)} = 2$, then $f(n) =$ _____

10. If $f(n) = O(g(n))$ but $f(n) \neq \Theta(g(n))$ then $f(n) =$ -------

(b) What is priority queue? Write the pseudocode for implementing the insert operation on a priority queue. Illustrate MAX-HEAP-INSERT(A,10) on the heap A = < 15,13,9,5,12,8,7,0,6,2,1>. **[8]**

(c) Explain briefly class P and class NP with examples. What is meant by an NP – Complete problem ? Give one example of an NP- complete problem. **[8]**

SECTION-II

Q.4 Answer the following **[18]**

(a) Shortest path problems are generally solved by greedy algorithm or dynamic programming? Why?

(b) How do Huffman codes help in text compression? Draw the Huffman tree for the weights(frequencies) [2,4,5,7,9,10,14,17,18,50].

(c) Compare and contrast naïve string-matching algorithm and Rabin – Karp algorithm.

Q.5 Answer the following **[20]**

(a) Define single-source shortest path problem, and show it exhibits optimal substructure. **[8]**

(b) What do you understand by edge relaxation? Explain. Give pseudo code of Digjaksta's Algorithm for solving single source shortage path problem. Explain its working in your own words. **[12]**

OR

Q.5 Answer the following **[20]**

(a) What is Red & Black tree ? What is it's use ? **[8]**

(b) Start with an empty red-black tree and insert the following keys in the given order: 5,14,9,2,18,50,28,1. Draw figures depicting your tree immediately after each insertion and following rebalancing rotation or color change(if any). Label all nodes with their color and identify the rotation type(if any) that is done. **[12]**

Q.6 Attempt the following (**Any One**) **[12]**

(a) Explain the steps followed for developing dynamic programming algorithm **clearly**, taking Longest common subsequence as an example.

(b) Find an optimal perenthesization of matrix-chain product whose sequence of dimensions is < 5,4, 6, 2, 3 >

M.Tech.-1 (Web. Tech.) Examination
Web Application Developemnt-I

Time : 3 Hours]   December 2018   [Max. Marks : 100

Instructions:
1. Write each section in separate answer sheet.
2. Numbers to the right indicate full marks of the question.
3. Make appropriate assumption whenever necessary.

SECTION – I

Q-1   **Attempt the following (any ten)**   20
1. What are various PHP tag styles? Write one example of each tag style.
2. What are the two differences between a class constant and static method or static property?
3. What is a jagged array? Write one example of jagged array.
4. Explain explode function with its general syntax and example.
5. What do you mean by superglobal variable? Write only name of any two superglobal variables.
6. Differentiate == (= =) and === (= = =) PHP operator with appropriate example.
7. Write only name of any four character classes used in POSIX style regular expression.
8. What is the meaning of following special character used in POSIX regular expression outside square bracket
          I.   ^   II. . (dot)
9. Write only name of various data types available in PHP.
10. What will be output of the following code:

    ```
    $value = 3.48;
    $ceil = ceil($value);
    echo "<br> $ceil ";
    $floor = floor($value);
    echo "<br> $floor ";
    ```
11. What is an associative array? Write one example of associative array.
12. What do you mean by weakly typed language? Is PHP weaked type language?

Q-2   **Attempt the following (any four)**   20
1. What are the PHP's strength?Explain any three PHP's strength compare to its competitors.
2. What do you mean by identifiers for PHP? Write the rules for identifiers.
3. List and explain any five built-in methods of Exception class.
4. Explain the meaning of following for Object-Oriented concepts in PHP:
   I. class II. object III. interface IV. overriding V. polymorphism
5. Explain the following function with appropriate example.
        i.   func_num_args   ii. func_get_args   iii. Shuffle

Q-3   **Attempt the following (any two)**   10
1. Write a PHP script which allows user to enter marks obtained and total marks. Based on these data, the program will display percentage obtained and the grade. Grade will

be as follow:
If percentage >= 80 then A Grade
If percentage >= 70 then B Grade
If percentage >= 60 then C Grade
If percentage >= 50 then D grade

2. Explain with example use of the functions in PHP
   i. empty ii. isnumeric iii. require iv. include
3. Create a class named category with attributes catname and manf for categoryname and manufacturer. Also create an interface name categorytype with method prodinfo. The method prodinfo will display all the details of products (pid, pname, catname and manf). Create a class product with attributes pid and pname. The class products inherit class category and implements interface categorytype.

SECTION – II

Q-4   **Attempt the following (any ten)**   20
1. What are the four levels of privilege available in MySQL?
2. Differentiate enum and set data type of MySQL.
3. What is the principle of least privilege?
4. What is the maximum length of mysql identifier for
   I.   Database II. Column
5. Write only name of various types of relationship between data in two tables.
6. List and explain wild card characters that are typically used with like operator in Mysql?
7. Write only name of DML statements.
8. What do you mean by anomalies? Write only name of various anomalies in a relation.
9. Write only name of any four grant tables.
10. Write only name of any four aggregate functions of MySQL.
11. Write the command to create user as username Tom and password as Jerry in MySQL.
12. What do you mean by transaction? Write only properties name required for database transaction.

Q-5   **Attempt the following (any four)**   20
1. Explain state management technique in PHP.
2. Explain web database architecture with appropriate diagram.
3. Explain following RDBMS concepts:
   i. table ii. attribute iii. record iv. value v. schema
4. Compare following subquery operators with appropriate example.
   1. ANY 2. ALL
5. Explain the following PHP functions with appropriate example:
   i. mktime ii. strtotime iii. Date

Q-6   **Attempt the following (any two)**   10
1. What do you mean by cookies? What are the typical uses of cookies?
2. List and explain various File Modes with their name and use.
3. List and explain various elements (keys) of nested array in $_FILE.

1812E1572　　　　Candidate's Seat No :＿＿＿＿＿

M.Tech.-1 (N. & C.) Examination
Networking-I

Time : 3 Hours]　　　　**December 2018**　　　　[Max. Marks : 100

Section-A

Q.1　Answer the following (any two)　　　　(16 Marks)
1.　Explain need for data communication in today's world.
2.　Explain advantages of Internet in education system.
3.　Discuss various communication models.
4.　Write a short note on: Protocol Architecture

Q.2　Answer the following (any two)　　　　(16 Marks)
1.　Discuss simple protocol architecture.
2.　Explain the TCP/IP protocol with its advantages.
3.　Explain need for protocol.
4.　Discuss traditional internet-based applications.

Q.3　Answer the following (any two)　　　　(18 Marks)
1.　Discuss analog transmission.
2.　Differentiate: LAN v/s WAN
3.　Explain digital transmission.
4.　Discuss transmission impairments.

Section-B

Q.4　Answer the following (any one)　　　　(16 Marks)
1.　Write a short note on: Channel capacity.
2.　Explain guided transmission media.
3.　Discuss wireless transmission.

Q.5　Answer the following (any two)　　　　(16 Marks)
1.　Discuss wireless propagation with an example.
2.　Explain line-of-sight transmission
3.　Discuss digital data & digital signals.
4.　Differentiate: Analog signal v/s Digital signal

Q.6　Answer the following (any two)　　　　(18 Marks)
1.　Write a short note on: Hamming code
2.　Explain forward error correction.
3.　Explain cyclic redundancy check.
4.　Discuss parity check with an example.
5.　Explain Internet checksum.

1912E1580   Candidate's Seat No : _____

M.Tech.-I (N.C. + Web. Tech.) Examination
Internat Programming

Time : 3 Hours]   December 2018   [Max. Marks : 100

Note : (1) Write both the sections in the separate answer books.
(2) Figures to the right indicate full marks.
(3) Write precise and to the point answers.

SECTION-I

Q.1 Answer the following (Any three)   [18]
(a) Discuss the features of Python.
(b) Explain looping statements in python, with an example.
(c) What are functions? Explain with its types.
(d) Explain classes and objects along with its syntax and example.

Q.2 Answer the following (Any four)   [16]
(a) Difference between lists and tuples.
(b) What is a dictionary? How it can be manipulated?
(c) Explain the purpose of statements: break, continue, and pass.
(d) How are mathematical operations handled in python?
(e) What is the use of eval and exec functions?

Q.3 Do as directed   [16]
(a) Fill in the blanks:
   i. In python, _____ symbol is used for single line comment, while _____ symbol is used for indicating multi-line comments.
   ii. _____ function is used to identify data type of an object, while _____ function is used to convert any data type to a string object.
(b) Identify whether the statement is true or false and provide explanation:
   i. In python, if and switch statements are used for conditional execution of program.
   ii. Python reserves { } notation for an empty set declared in a program.
(c) Define: compiler and interpreter.

P. T. O.

(d) Match the following python modules with its equivalent description:

Time	Handles ratio of two integers
System	Generates arbitrary numbers
Fraction	Handles underlying OS operations
Random	Works with time specific tasks

SECTION-II

Q.4 Answer the following (Any three) [18]

(a) How to handle files in python?

(b) Explain turtle graphics. List down functions provided by this python module with an example.

(c) How to create GUI based applications using tkinter module in python?

(d) How to handle exceptions in python?

Q.5 Answer the following (Any four) [12]

(a) What is the need of lambda expressions?

(b) What are generators?

(c) Explain socket in brief.

(d) Difference between TCP and UDP.

(e) How to consume web services in python?

Q.6 Do as directed [20]

(a) Consider the following program that attempts to compute the circumference of a circle given the radius entered by the user. Given a circle's radius, r, the circle's circumference, C is given by the formula:

$$C = 2\pi r$$

```
#Circumference Program
r = 0
PI = 3.14159

# Formula for the area of a circle given its radius
C = 2 * PI * r

# Get the radius from the user
r = float(input("Please enter the circle's radius:"))

# Print the circumference
print("Circumference is", C)
```

i. The program does not produce the intended result. Why?

ii. How can it be repaired so that it works correctly?

(b) Consider the following program:

```
# x, y, and z are numbers
if x < y:
        if y < z:
                x = y
        else:
                y = z
else:
        if y > z:
                y = x
        else:
                x = z
print("x =", x, " y =", y, " z =", z)
```

What will the code print if the variables x, y, and z have the following values?

i. x = 3, y = 5, and z = 7

ii. x = 3, y = 7, and z = 5

iii. x = 5, y = 3, and z = 7

iv. x = 5, y = 7, and z = 3

(c) Given the following set:
fruits = {"apple", "banana", "cherry"}

Indicate what each of the following code fragments will print:

i. fruits.update(["orange", "mango"])
   print(fruits)

ii. print(len(fruits))

iii. x = fruits.pop()
   print(x)

iv. fruits.remove("orange")
   print(fruits)

P.T.O

(d) Correct three syntax errors and display the output of the following program:

```
# Display table of a number
number = 5
for x of range(2, 11, 2)
        if x % 2 = 0:
                    print(number, 'x', x, '=', number*x)
        else:
            print("*")
```

(e) Write a python program to find out minimum and maximum of numbers stored inside a list. Take input of numbers from the user.

2112E1596   Candidate's Seat No :_____

M.Tech.-1 (N.C.+Web Tech.) Examination
Research Methodology for Computer Science

Time : 3 Hours]   December 2018   [Max. Marks : 100

SECTION-I

Q1.(a) Give difference between :   [10]

(i)   Elements, Variables and Observations
(ii)   Nominal and Ordinal Scale
(iii)   Qualitative and Quantitative data
(iv)   Experimental and Observational Statistics
(v)   Discrete and Continuous

Q1.(b) Explain: [5]

i.   Scientific notation
ii.   Significant digits
iii.   Rounding off
iv.   Logarithmic notation
v.   Equation of line

Q1.(c) For the following values, do the following: [3]

i.   0.0028: find the number of significant digits
ii.   0.09800: find the maximum error
iii.   0.00018400: write the scientific notation

Q2.   Construct a frequency distribution with the suitable class interval size of   [16]
marks obtained by 50 students of a class, which are given below:

23, 50, 38, 42, 63, 75, 12, 33, 26, 39, 35, 47, 43, 52, 56, 59, 64, 77, 15, 21,
51, 54, 72, 68, 36, 65, 52, 60, 27, 34, 47, 48, 55, 58, 59, 62, 51, 48, 50, 41,
57, 65, 54, 43, 56, 44, 30, 46, 67, 53. Also find:

i.   Relative frequency table

ii.   Cumulative frequency table

iii.   Draw the bar chart of the sample and the polygon.
iv.   Draw the cumulative relative frequency bar chart and polygon

v.   Construct the ogive plot

OR

Q2.   The sales of a company (in million dollars) for each year are shown in the table   [16]
below.

x (year)	2005	2006	2007	2008	2009
y (sales)	12	19	29	37	45

i.   Draw the line of regression
ii.   Derive the equation using least square approach

P. T. O.

iii. Extrapolate for year 2012

Q3. Give advantages and disadvantages of mean, median and mode. For the given data [16]
24, 25, 28, 31, 33, 33, 36, 42, 42, 48, 51, 57, 57, 68, 75, 79, 79, 79, 85 compute
Mean
Median
Mode
90th percentile

OR

Q3. For the following data values compute range, interquartile range, variance, standard [16]
deviation
12, 6, 7, 3, 15, 10, 18, 5.
Explain why standard deviation is the best measure of dispersion.

SECTION-II

Q4. Give difference between sample and population. List down the steps during [18]
sampling design. What are the criteria for selecting a sampling procedure?

Q5. Explain with examples: [16]

i. Systematic sampling
ii. Stratified sampling
iii.
iv. Quota sampling

OR

Q5. With respect to research, explain: [16]

i. Characteristics of research
ii. Criteria of a good research
iii. Sources of research problem
iv. Define a research problem

Q6. In context of literature review, explain: [16]

i. Objectives
ii. Need
iii. Precautions in library use

OR

Q6. How is a research problem evaluated? List down the various sources of literature. [16]
What is the importance of Mendeley reference management system?

2012E1586

Candidate's Seat No :_____

M.Tech.-1 (N.C.) Examination
Mobile Adhoc Network
December 2018

Time : 3 Hours]

[Max. Marks : 100

SECTION-I

Q.1. (a) What is Ad Hoc Networks? List out and discuss commercial applications of Ad Hoc Networking.   10

Q.2. (a) Discuss about Contention based protocols with reservation mechanism.   20

OR

Q-2 (a) What are the issues to be considered while designing a MAC protocol for Ad-Hoc wireless Networks? Discuss.   10

(b) What is network simulation? Explain advantages and disadvantages of network simulation.   10

Q.3. (a) What is DSDV routing protocols?. How the route is established in DSDV routing protocols? Explain it with one example of ad hoc network with 5 nodes.   20

OR

Q-3 (a) What is Near Term Digital Radio (NTDR)? Draw NTDR Network Architecture and discuss its Clusterheads, Cluster Affliation and Routing.   20

SECTION-II

Q.1. (a) List out and discuss Technical and Market Factors Affecting Ad Hoc Networks.   10

Q.2. (a) Discuss Unicast Route Establishment and Route Maintenance of AODV routing protocols with one example of ad hoc networks with certain number of nodes.   20

OR

Q-2 (a) What are the classifications of MAC protocol? Discuss.   10

(b) Define reactive routing protocol. Explain in brief about route discovery of DSR routing table.   10

Q.3. (a) What do you mean by Active Attacks and Passive Attacks. List out and discuss the major security threats that exist for routing in ad hoc wireless networks.   20

OR

Q-3 (a) Define Secure Routing and discus ARAN secure routing protocol in details.   20

**** Best of luck ****

2012E1587

Candidate's Seat No :_____

M.Tech.-1 (Web. Tech.) Examination
Client Side Scripting

Time : 3 Hours]

December 2018

[Max. Marks : 100

Section-A

Q.1 Answer the following (any two)   (16 Marks)
1. Explain the need of website in today's world?
2. Discuss evolution of HTML5 with its comparison to all previous versions.
3. Explain need to scripting language for web site creation.
4. Discuss the limitations of HTML5.

Q.2 Answer the following (any two)   (16 Marks)
1. What is responsive website? Explain with appropriate examples.
2. Explain new structure elements for HTML5.
3. Discuss styling HTML with CCS.
4. Explain how to adding blogspot and comments in HTML5.

Q.3 Answer the following (any two)   (18 Marks)
1. Write a short note on: WAI-ARIA
2. Write a short note on: Global attributes for website
3. Explain how to user <progress> & <meter> elements.
4. Explain how to overriding browser defaults.

Section-B

Q.4 Answer the following (any two)   (16 Marks)
1. How to use Java script for DIY validation?
2. How to avoiding validation in forms.
3. Explain the user of multimedia accessibility.
4. Explain synchronizing media tracks in website.

Q.5 Answer the following (any two)   (16 Marks)
1. Write a short note on: Canvas basics
2. Write a short note on: Web Storage
3. Explain Web SQL database.
4. Discuss role of selectors for CSS3.

Q.6 Answer the following (any two)   (18 Marks)
1. Explain 2D / 3D transformations for CSS3.
2. Explain the advantages of CSS3.
3. Write a short note on: User Interface design for CSS3.
4. Discuss with an example : Flex Grid

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