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FIFTH SEMESTER

Roll No.....  
B.E. (IT)

Sept.  
B.E. MID SEM. EXAMINATION, ~~MAY~~ 2015  
Internet and Web Engineering (IT-401)

1:30 Hrs.  
Marks: 20

**Note:** Attempt ALL questions.

- List some features of web engineering which makes it different from software engineering? (4)
- Why the web development process is evolutionary in nature? (3)
- Distinguish between internet, intranet and extranet with the help of suitable examples? (3)
- What is double DES? What kind of attack on double DES makes it useless? (4)
- Compare and contrast the attacks on digital signatures with attacks on cryptosystems. (4)
- Distinguish between the following: (1\*2=2)
  - a. Feistel and non-Feistel block cipher.
  - b. Diffusion and Confusion

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SEVENTH SEMESTER

B.E. (IT)

MID SEMESTER EXAMINATION, SEPTEMBER-2015

IT-402: Distributed Systems and Computing

Time: 1:30 Hrs.

Max. Marks: 20

**Note:** Attempt ALL questions.  
All questions carry equal marks.  
Assume suitable missing data, if any

1. What are Distributed Systems? Discuss the various models that are used for building distributed computing systems.
2. What is a fault and list its types in a distributed system? Explain the fault-handling mechanisms in distributed systems.
3. What are the useful characteristics in terms of multicast messages for constructing the distributed systems.
4. What is the role of stub in remote procedure call execution? How do stubs make remote procedure call execution transparent?

**OR**

Differentiate between the following:

- a) Monolithic kernel and Microkernel
  - b) Pipe and FIFO
5. What are the characteristics of inter-process communication. Describe the ways in which request reply protocol masks the heterogeneity of distributed system.
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SEVENTH SEMESTER

Roll No.-----  
B.E. (IT)

MID SEMESTER EXAMINATION, September-2015

IT-403: Compiler and Translator Design

Time: 1:30 Hrs

Max. Marks: 20

**Note:** All questions are compulsory. Assume suitable missing data, if any.

1. a) Write down the phases of a compiler. What is the advantage of dividing the design of a compiler into front-end design and back-end design? [3]  
b) Define the following terms with an example: Token, Lexeme, Regular Definitions, Context Free Grammar, Sentinels [5]
2. Construct NFA for the following regular expression using Thompson's construction.  
a(a | b)\*aab  
Construct the corresponding DFA from the above NFA [4]

3. Consider the following program:

```
main ()  
{  
    int x, y, z;  
    if (x == y)  
        z = x + y*10;  
}
```

List down the lexemes, tokens and the attributes of the tokens, at the end of the lexical analysis of the above program. [4]

4. Test whether the grammar is LL(1) or not, and construct a predictive parsing table for the following grammar:  
S → A  
A → aB | Ad  
B → bBC | f  
C → g

Parse the input string abfg using non-recursive predictive parser. [4]

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VII SEMESTER

Roll No. ....  
B.TECH (IT)

MID SEMESTER EXAMINATION, SEPTEMBER, 2015

**IT 404: PATTERN RECOGNITION**

Time : 1:30 Hrs

Max Marks: 20 Marks

Note: Attempt all questions.  
Assume suitable missing data, if any.

- Q.1) What is Pattern Recognition? Explain different components of Pattern Recognition system. (3)
- Q.2) Enumerate the difference between supervised and unsupervised classification. What do you understand by linearly separable class? (2)
- Q.3) Explain the concept of Bayesian decision theory in pattern recognition for a two class problem. Also explain the concept of Bayesian decision theory for Continuous Features (Generalized Bayes theory) (3)
- Q.4) Define Gaussian Multivariate Normal Density function. Explain and describe the shape of major and minor axis for Gaussian bivariate Normal Density function considering the different cases of covariance matrix. (4)
- Case1) when off diagonal elements are zero and variances are equal
- Case2) when off diagonal elements are zero and variances are different
- Case3) when off diagonal elements are non zero and variances are also different
- Q.5) An incoming e-mail is either a normal (potentially important) e-mail ( $\omega_1$ ) or a junk mail ( $\omega_2$ ). We have two actions:  $\alpha_1$  (keep the mail) and  $\alpha_2$  (put the mail to /dev/null). If  $P(\omega_1) = 0.4$ ;  $P(\omega_2) = 0.6$ . Now, an e-mail has been received and its feature vector is  $x$ . Based on the feature vector, the computed class conditional probabilities are  $p(x|\omega_1) = 0.35$ ;  $p(x|\omega_2) = 0.65$ . Suggest proper loss function which will retain the important mail if they are potentially important and verify by Bayesian risk, computing minimum risk classifier. (4)
- Q.6) (Solve any ONE): 1) Explain the relevance of each of the following terms: variance, standard deviation, covariance matrix and probability density function in data analysis (4)
- 2) Discriminant Functions for the normal density (for different cases) (4)

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VII SEMESTER

Roll No. : .....  
B.TECH (IT)

MID SEMESTER EXAMINATION, SEPTEMBER, 2015  
IT 405: ADVANCES IN DIGITAL SYSTEM DESIGN

Time: 1:30 Hrs

Max Marks: 20 Marks

Note: Attempt all questions.  
Assume suitable missing data, if any.

1. Explain ROM, PROM, PLA, PAL, and GLA. (2.5)
2. Design a combinational circuit using a ROM. The circuit accepts a three-bit number and outputs a binary number equal to the square of the input number. (3)
3. Implement the following Boolean functions with PAL, by using three-wide AND-OR structure:  
 $w(A, B, C, D) = \sum (2, 12, 13)$   
 $x(A, B, C, D) = \sum (7, 8, 9, 10, 11, 12, 13, 14, 15)$   
 $y(A, B, C, D) = \sum (0, 2, 3, 4, 5, 6, 7, 8, 10, 11, 15)$   
 $z(A, B, C, D) = \sum (1, 2, 8, 12, 13)$  (4)
4. Generate a behavior style VHDL code for ALU. The Functional Description of 4-bit Arithmetic Logic Unit is Controlled by the three function select inputs (S0 to S2), as shown in selection table. ALU can perform all the 8 possible logic operations. (4)

S <sub>2</sub>	S <sub>1</sub>	S <sub>0</sub>	Function (F)
0	0	0	A+B
0	0	1	A-B
0	1	0	A-1
0	1	1	A+1
1	0	0	$A \wedge B$
1	0	1	$A \vee B$
1	1	0	NOT A
1	1	1	$A \oplus B$

5. Why parallel systems are required? List the common characteristics of parallel systems. Also differentiate between multiprocessors and multicomputers. (2.5)
6. Why multicomputers are good candidates for large-scale parallel computation? Explain in brief common interconnection networks for multicomputers. (2.5)
7. Write short note on (any ONE):  
1) Different levels of abstraction in VHDL (1.5)  
2) FPGA (1.5)

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