

**COLLEGE OF ENGINEERING PUNE**  
(An Autonomous Institute of Govt. of Maharashtra)

END -SEM EXAM  
**Computational Biology**

Program: **Final Year B.Tech. (Computer Engg./ Info. Tech.)**

Year: 2011-12

Semester: **Spring**

Date: 05-05-12

Duration: 3 hrs.

Max. Marks: 50.

**Instructions:**

1. **Make appropriate assumptions wherever necessary.**
2. **Give examples and draw neat diagrams wherever necessary.**

- Q.1. A. Build the tree from the following distance matrix between species A,B,C,D (05)  
using the UPGMA (Unweighted Pair Group Method using arithmetic Averages) method

|   | A | B    | C    | D    |
|---|---|------|------|------|
| A |   | 0.26 | 0.34 | 0.29 |
| B |   |      | 0.42 | 0.44 |
| C |   |      |      | 0.44 |
| D |   |      |      |      |

- B. Compute the global alignment between the two strings  $s_1 = \text{ACCGTT}$  and  $s_2 = \text{AGTTCA}$ , considering the following scoring parameters: +1 for match, -1 for mismatch, and -1 for a gap. (05)
- (i) What is the maximum similarity score between the two sequences  $s_1$  and  $s_2$ ?
  - (ii) Find an alignment with this similarity score.
  - (iii) Is the alignment you found unique, or are there multiple alignments achieving the maximum similarity score?

- Q.2. A. a) Why do we use dynamic programming algorithms for pairwise sequence alignment problems but not for multiple pairwise alignments? (05)  
b) What is the difference between local alignment and global alignment  
c) Given uses for global alignment and local alignment
- B. a) What kind of biological data the following file formats store: FASTA and PDB? (05)  
b) Name two biological pathway databases?  
c) Which of the two provides a comparison of pathways among various organisms?

**Q.3.**

- a) What is the purpose of BLAST tool? (01)
- b) Explain the algorithm step wise. (05)
- c) Explain the impact of word size on the results. (02)
- d) What is the typical value of work size for protein comparison and DNA comparison? (01)
- e) Explain importance of e-value (01)

**Q.4.**

- a) What is Next Generation sequencing? What are the applications of NGS technologies? What is de novo genome assembly? (02)
- b) What are the commonly used methodologies for de novo assembly? Explain the De bruijn graph based method of genome assembly. (03)
- c) Explain algorithmic steps in BFAST along with the data structures used. Explain diagrammatically with an example. (10)
- d) Why Smith-Waterman algorithm is not suitable for genome mapping. (03)
- e) How gapped alignments are supported in BFAST (02)

COLLEGE OF ENGINEERING, PUNE  
DEPT. OF COMPUTER ENGG. AND INFORMATION TECHNOLOGY

End-Semester Examination

SERVICE ORIENTED ARCHITECTURE

Class:- B.Tech (Comp - IT)

Year :- 2011-2012

Marks :- 100

Semester :- VIII

Duration :- 3 hours

**Instructions :-**

1. Attempt all questions.
2. Figures to the right indicate full marks.
3. Draw neat figures/diagrams wherever required.

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- Q 1. A. Write a short note on SOA timeline [4]
- B. What do you understand by Business Process Management(BPM)? What are the main goals and benefits of BPM? Give a brief overview of the four components of Business Process Management System (BPMS), namely, Process Modeling, Process Execution, Process Monitoring and Business Activity Monitoring. [10]
- C. What are the challenges for SOA ? List the architectural requirement for each challenge. [6]
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- Q 2. A. How are XML technologies used for Service-Level Data Model and Data Handling? What do you understand by Service Discovery? [5]
- B. "Web Services Platform provides the core facilities so that the Service Requestors and Service Providers interact with each other in a consistent manner independent of the underlying technology platforms." Provide your analysis of this statement. Draw appropriate diagrams to enhance your explanation wherever necessary. [5]
- C. Distinguish between Service Choreography and Service Orchestration, with appropriate diagrams and examples. Compare the Orchestration-Centric and Chorographic-Centric approach to Web Service Composition. [10]
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- Q 3. A. "A complete solution for service-level security for Web services is a patchwork of standards". Justify this statement appropriately, listing down in a tabular form the Web Services support for 'Authentication', 'Authorization', 'Single sign-on', 'Data Privacy' and 'Data Integrity'. [6]
- B. The 'Picasa Album' service provider is being used by an on-line diary application called 'Penzu'. The interaction pattern between the service provider and the service requester expects the requester (here 'Penzu') to wait for the service provider (here 'Picasa') for a service response for every request generated. Which interaction pattern would they use? Describe the service level interaction pattern you choose to apply. [6]

C. Explain with appropriate diagrams, wherever applicable the following four message exchange service interaction paradigms:

- (i) Publish-Subscribe
- (ii) Request-Response
- (iii) Request-Callback
- (iv) Asynchronous Store and Forward Messaging

[8]

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Q 4. A. What is the need for Notification Systems in SOA? What do you understand by the term WS-Notification and WS-Eventing?

**OR**

Explain the MVC architectural pattern and how it can be implemented in J2EE (or any language/platform of your choice). Also mention its benefits.

[7]

B. Illustrate and describe the key components and elements that constitute the Enterprise Service Bus (ESB) Pattern.

[7]

C. Define and enumerate the steps in Service Oriented Analysis. Explain how you performed Service Oriented Analysis in your assignments/projects.

[6]

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Q 5. A. Create a Business Process Flow Diagram for Opening a Customer Account . Describe the activities involved in each step.

[7]

B. "It is possible to reuse a traditional three-tier application as a service-oriented application by creating services at the business logic layer and using a service bus." Justify this statement with appropriate diagram and example.

[6]

C. List and explain "Service Design Principles".

**OR**

With a neat diagram and case study example illustrate a common scenario where reliable messaging is used and gives benefits.

[7]

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COLLEGE OF ENGINEERING, PUNE

Computer Engineering and IT Department

Date :- 05.05.12

Class- B.Tech. (Comp.Engg. and IT)

Exam: End-Sem

Time: 3 Hrs.

Subject: (CT429-5)-Cyber Law (Elective)

Year – 2011-12

Marks: 50

**Instructions :-**

1. All questions are compulsory.
2. Uses of any electronics devices are strictly prohibited.
3. Use Black or Blue ink color pen only.

- Q.1 State True/False with your justification for the following: 10
- I. Internet security can provide a more secure solution, as well as one that is faster and less expensive than traditional solutions to security problems of employees photocopying proprietary information, faxing or mailing purchase orders, or placing orders by phone.
  - II. True or False? Intrusion detection systems prevent computer systems from preparing for and dealing with attacks.
  - III. True or False? The firewall you decide to use will not prevent most of the attacks on your network; however, firewalls will protect against dial-in modem attacks, virus attacks, or attacks from within your company.
  - IV. The purpose of a digital ID is to reliably separate a public and private key pair with its owner.
  - V. A network-based IDS, which can be software running on multiple PCs or on a dedicated appliance, tracks and analyzes the packets that make up network data traffic.

- Q.2 Explain Security and User Account Architecture for Windows operating System. 10  
What are the various ways for cracking/breaking windows passwords?

- Q.3 Read and find out the evidence collection and investigation procedure for the following case study. 10
- The founder and majority shareholder of a consultancy business sold his interest to a multinational communications corporation. The contract of sale contained restraint clauses, prohibitions on the removal of confidential information, and non solicitation of staff and client clauses. After about a year, the client—the multinational—became suspicious that he was acting in breach of contract. A computer forensics firm was asked to investigate. At the outset, the firm suggested that the individual's desktop and laptop computers be recovered to copy the hard disks and analyze their contents. Within an encrypted file on his desktop, the firm found a draft business plan for a new enterprise that would compete with his former business. On his laptop, in a deleted file that was restored, the firm recovered details of key clients and revenue streams. It was possible to demonstrate that information had been updated within these files after he had left the company, but before he had returned the computer. Taken together, the evidence was sufficient to initiate criminal proceedings.

Q.4 What is IDS and Firewall? How they work? Explain use of any tool for packet analyzer. 10

Q.5 Several managers left a software-design firm. Within a few weeks, they started up a new firm, producing similar products, in direct competition with the original firm. A computer forensics team was hired to inspect former managers' computers, which had been erased. Evidence that the business plan and designs for a new firm were taken directly from the original firm was uncovered. The new firm was enjoined by the court from offering their product until sufficient time had passed for them to have produced their own designs. The former managers were given a 9-month injunction. 10

With reference to above illustration, how the Indian IT Act 2000 played an important role to give punishment to the former manager?