Roll No. | | | | | | | | | | |

M.E /M.Tech (Full Time /PartTime) END SEMESTER EXAMINATIONS, Nov / Dec 2015

COMPUTER SCIENCE AND ENGINEERING

III Semester

CP 8202 MACHINE LEARNING TECHNIQUES

(Regulation 2013)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Give few applications of learning techniques.
2. Which distribution model is used for continuous variables? Give its form.
3. Does adding Regularization term to an error function controls over fitting? Justify your answer.
4. How to find an efficient technique for evaluating the gradient of an error function E(w) for a feed-forward neural network?
5. Why to perform dimensionality reduction?
6. Differentiate generative models with discriminative models.
7. What is markov random field?
8. How to convert directed to undirected graph?
9. A teacher knows that heavy lunch causes a student to sleep 50% of the time. The Prior probability of a student having heavy lunch is 1/50,000 and the Prior probability of any student sleeping in the class is 1/20. If the student is sleeping in the class, what is the probability the student had heavy lunch?
10. Sketch the MDP model for reinforcement learning

Part – B (5 x 16 = 80 marks)
(Question No.11 is Compulsory)

11. a) Discuss about the Linear basis Function models in detail. (8)

    b) For a single target variable ***t***, present the bayesian linear regression to avoid over- fitting problem of maximum likelihood. (8)

12. a) i) Present the discriminant functions for Linear classification models. How to learn the parameter for these functions. (8)

ii) Construct the decision tree for the given data:(8)

Tid	Home Owner	Marital Status	Annual Income	Defaulted Borrower
1	Yes	Single	125K	No
2	No	Married	100K	No
3	No	Single	70K	No
4	Yes	Married	120K	No
5	No	Divorced	95K	Yes
6	No	Married	60K	No
7	Yes	Divorced	220K	No
8	No	Single	85K	Yes
9	No	Married	75K	No
10	No	Single	90K	Yes

(OR)

b) i) With a neat sketch of two layer neural network diagram for sigmoidal output unit activation function, discuss about Feed Forward Network functions in detail. (8)

ii) Explain ensemble learning in detail. (8)

13. a) i) Write the K-means clustering algorithm. What are the limitations of it? Consider the following eight points P1(2,2), P2(1,14), P3(10,7), P4(1,11), P5(3,4), P6(11,8), P7(4,3), P8(12,9). Take P1,P2,P7 as initial centroids. Calculate two successive positions of those centroids. (8)

ii) Discuss how to find the maximum likelihood solutions using Expectation-Maximization algorithm (8)

(OR)

b) i) Describe Principal Component Analysis based on projection error minimization with example. (10)

ii) Describe factor analysis and the steps involved in performing the analysis in detail. (6)

14. a) i) Discuss about the concept of Naive bayes classifiers. (8)

Day	Outlook	Temp.	Humidity	Wind	Play Tennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Weak	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cold	Normal	Weak	Yes
D10	Rain	Mild	Normal	Strong	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

Predict the target value for the new instance(Outlook=sunny, Temperature=cool, Humidity=high, Wind=strong) for the target concept playTennis.

ii) Explain hidden markov model in detail. (8)

(OR)

b) i) Explain Conditional random fields in detail (10)

ii) Write short notes on : Directed graphical models. (6)

15. a) i) Present the adaptive dynamic programming method with a neat diagram. (8)

ii) Explain Temporal difference learning with a neat example. (8)

(OR)

b) With an example, describe Monte carlo sampling method. (8)

Write short notes on : mistake bound analysis and occam learning .(4+4)

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Roll No. | | | | | | | | | | |

M.E /M.Tech (Full Time /PartTime) END SEMESTER EXAMINATIONS, Nov / Dec 2015

COMPUTER SCIENCE AND ENGINEERING

III Semester

CP 8202 MACHINE LEARNING TECHNIQUES

(Regulation 2013)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

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2. Which distribution model is used for continuous variables? Give its form.
3. Does adding Regularization term to an error function controls over fitting? Justify your answer.
4. How to find an efficient technique for evaluating the gradient of an error function E(w) for a feed-forward neural network?
5. Why to perform dimensionality reduction?
6. Differentiate generative models with discriminative models.
7. What is markov random field?
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9. A teacher knows that heavy lunch causes a student to sleep 50% of the time. The Prior probability of a student having heavy lunch is 1/50,000 and the Prior probability of any student sleeping in the class is 1/20. If the student is sleeping in the class, what is the probability the student had heavy lunch?
10. Sketch the MDP model for reinforcement learning

Part – B (5 x 16 = 80 marks)
(Question No.11 is Compulsory)

11. a) Discuss about the Linear basis Function models in detail. (8)

    b) For a single target variable ***t***, present the bayesian linear regression to avoid over- fitting problem of maximum likelihood. (8)

12. a) i) Present the discriminant functions for Linear classification models. How to learn the parameter for these functions. (8)

ii) Construct the decision tree for the given data:(8)

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9	No	Married	75K	No
10	No	Single	90K	Yes

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13. a) i) Write the K-means clustering algorithm. What are the limitations of it? Consider the following eight points P1(2,2), P2(1,14), P3(10,7), P4(1,11), P5(3,4), P6(11,8), P7(4,3), P8(12,9). Take P1,P2,P7 as initial centroids. Calculate two successive positions of those centroids. (8)

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Predict the target value for the new instance(Outlook=sunny, Temperature=cool, Humidity=high, Wind=strong) for the target concept playTennis.

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Write short notes on : mistake bound analysis and occam learning .(4+4)

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Roll No. | | | | | | | | | | |

M.E / M.Tech (Full Time/Part Time) DEGREE END SEMESTER EXAMINATIONS, Nov/Dec 2015

COMPUTER SCIENCE AND ENGINEERING

II Semester

CP8201 Advances in Compiler Design

(Regulation 2013)

Time: 3 Hours Answer ALL Questions Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Name few algebraic simplification techniques .
2. Discuss the circumstances under which you would go for optimization
3. Justify the need for Forward substitution.
4. How do you eliminate Tail recursion?
5. What is an interference graph
6. Why do you think scheduling is a hard problem?
7. Justify the need for poison bit and its use
8. What are the metrics to estimate parallel applications.
9. What is a call string? Give example
10. Construct a call graph for the following functions:

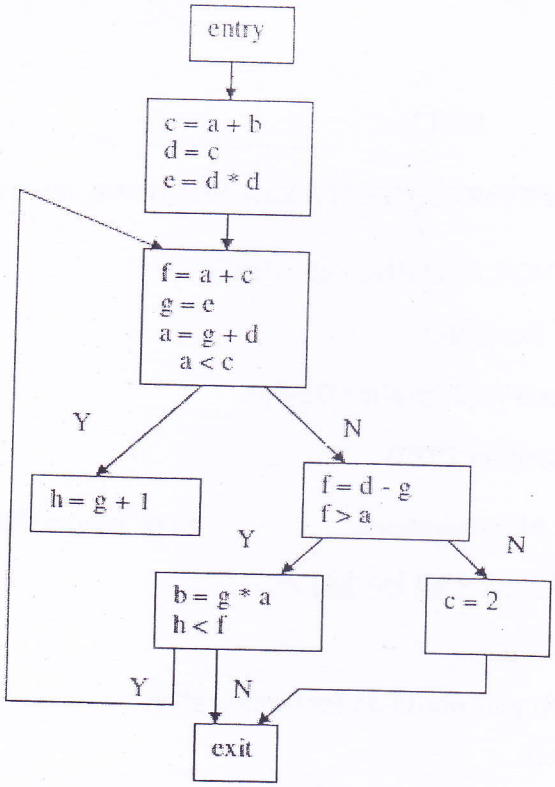
```
int g( int a)
{ b = f(a);
  c = f(b);
}
int f(int a)
{ k = t (a);
}
```

Part – B (5 x 16 = 80 marks)

11. i. Explain the phases of the compiler with an example. [8]

    ii. Write the algorithm or program for performing linear search. Write the intermediate code for the same and construct the flow graph. [8]

12. a) Consider the following flow graph. Identify the definitions that reach every block Explain clearly by means of data flow equations. [16]



(OR)

b) i. Perform the various loop optimizations and explain with an example. [8]

ii. Discuss procedure optimization with an example. [8]

13. a) i. Explain Peep-hole optimization in detail. Justify its use for instruction scheduling. [8]

ii. Construct the interference graph and state how many registers are required for the following sequence of instructions. [8]

x := d * x
d : = b*c
e: = a+b
b : = b*c
a : = e-d

(OR)

b) Discuss Brigg's and Chaitin's register allocation based on graph colouring. [16]

14. a) Write and explain the Region-based global scheduling algorithm. [16]

(OR)

b) i. Discuss the different kinds of spaces that are defined and used for optimizing loops involving arrays. [6]

Roll No. | | | | | | | | | | |

ii. Write and explain the Software-pipelining algorithm for acyclic graphs. [10]

15. a) Consider 2 relations r1(A,B) and r2(A,B) which are defined as follows [16]

r1

A	B
00	01
00	10
11	10

r2

A	B
00	11
10	01
11	10

Construct individual BDD's. Determine the union of the relations r1 and r2 and represent it using the BDD.

(OR)

b) i. Discuss about Just-in time compilation [8]

ii. Explain the issues in Inter-procedural analysis. [8]

Roll No. | | | | | | | | | | |

M.E / M.Tech (FT / PT) END SEMESTER EXAMINATIONS – Nov 2017

COMPUTER SCIENCE AND ENGINEERING

CP8011 - INFORMATION RETRIEVAL TECHNIQUES

(Regulation 2013)

Time: 3 Hours Answer ALL Questions Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What are the significant features of Boolean IR system?
2. What are the major components of a search engine?
3. How to compute term-frequency - inverse document frequency of a given document which contain the terms "Fuzzy Retrieval" with the frequency search: 7 and engine: 15 in the collection of 40 documents. The document frequencies are search: 15 and engine: 20.
4. Why there exists an inverse relationship between precision and recall?
5. How to construct an index for very large document collections? Why compression is accomplished for inverted indexes?
6. List out the steps involved in constructing suffix tree and suffix array for the string.
7. Short note on Latent Semantic Indexing with a suitable example.
8. What are the difference between flat and hierarchical clustering?
9. List out the key features of a crawler.
10. Differentiate static and dynamic ranking.

Part – B (5 x 16 = 80 marks)

(Question No.11 is Compulsory)

11.a) Explain the architecture of a typical IR system briefly describing each component and also explain the taxonomy of Information Retrieval models. **(12)**

b) Perform document linearization for the given query and assign weights for the terms in following. "Iterative query expansion modifies queries using terms from a user. Automatic query expansion expands queries automatically." **(4)**

12. a) i) Calculate the Inverse Document Frequency and rank the documents based on similarity analysis using vector method. **(12)**

Given Query: "Retrieve relevant information" and D= 3

D1: "The key goal is to retrieve relevant information "

D2: "A data retrieval language aims at retrieving all objects "

D3: "The web is becoming a universal repository of human knowledge "

ii) Write a brief notes on Fuzzy set model with suitable application. **(4)**

(OR)

12. b) i) Consider the collection contain four relevant documents. Contrast two systems run on this collection. Their top ten results are judged for relevance as follows (the leftmost item ranks top of the search results). **(12)**

System 1 R N R N N N N N R R

System 2 N R N N R R R N N N

i) What is the MAP of each system? Which has a higher MAP?

ii)Determine the precision and recall of the each system of the collection with 100 documents?

iii)What is the R-precision of each system?

b) Write a brief notes on Extended Boolean model with suitable examples. **(4)**

13. a) Explain the construction of an inverted index for textual leaflets and discuss how memory requirement is reduced with a suitable example. **(16)**

(OR)

13. b) Explain with suitable empirical evaluation on how query expansion is performed on a local set of documents in the set of collection. **(16)**

14. a) For a given SVM, how is the dependency on the weight vector in the primal space eliminated by recasting the optimization problem in the dual space and explain the method of finding optimal hyper plane corresponding to its optimal weight vectors. **(16)**

(OR)

14. b) Explain and compare the performance metrics of naïve Bayes, random forest, and k-nearest neighbor algorithms in information retrieval. Compute the performance metrics and time complexity of each algorithm **(16)**

15. a) Consider the collection contains N documents and the query contains M terms. Show with an example that the query response time is reduced by parallel IR system. **(16)**

(OR)

b) Explain briefly about Web Crawling and Indexing and Link Analysis. **(16)**

Roll No. | | | | | | | | | | |

M.E / M.Tech/ M.Arch/M.Sc/M.Phil (Part Time) END SEMESTER EXAMINATIONS,NOV/DEC 2017

Computer science and engineering

Semester II

CP8201 – ADVANCES IN COMPILER DESIGN

(Regulation 2013)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Name few algebraic simplification techniques.
2. What is the need for intermediate representations in compiler design?
3. Define tail call and tail recursion. Give an example.
4. Justify the need for forward substitution.
5. What is the use of instruction scheduling?
6. What is an interference graph?
7. Justify the need for poison bit and its use.
8. What are the metrics to estimate parallel applications?
9. Differentiate between context-sensitive and context-insensitive inter-procedural analysis.
10. What is a call string? Give an example.

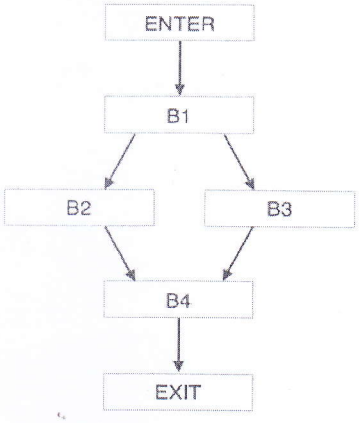
Part – B (5 x 16 = 80 marks)
(Question No.11 is Compulsory)

11. Explain in detail about the phases of the compiler with an example. (16)

12. a) i) Perform the various loop optimizations and explain with an example. (8)
    ii) Explain copy propagation with an example. (8)

    (OR)

    b) Consider the following flow graph. Identify the definitions that reach every block explain clearly by means of data flow equations. (16)



13. a) Discuss brigg's and chaitin's register allocation based on graph colorings. (16)

(OR)

b) i) Explain briefly the instruction selection by tree rewriting rules with an example. (8)
ii) Briefly explain the peephole optimizations. (8)

14. a) Write and explain the region-based global scheduling algorithm. (16)

(OR)

b) What is data reuse? Explain types of reuse with an example. (16)

15. a) i) Explain the issues in inter-procedural analysis. (8)
ii) Discuss about just-in-time compilation. (8)

(OR)

b) Describe briefly the context insensitive and sensitive inter-procedural analysis. (16)

Roll No. | | | | | | | | | | |

M.E /M.Tech (Full Time /PartTime) END SEMESTER EXAMINATIONS, Nov / Dec 2017

COMPUTER SCIENCE AND ENGINEERING

CP 8202 MACHINE LEARNING TECHNIQUES

(Regulation 2013)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is machine learning? give few applications.
2. Give the distribution of continuous variable.
3. How to control over fitting?
4. Which method can be used to evaluate error function in neural networks?
5. What is clustering and classification?
6. What is a latent variable model?
7. Compare directed vs undirected graphs.
8. How a naive bayes classifiers works?
9. What is a Policy in a reinforcement learning environment?
10. Comment on: Occam learning.

Part – B (5 x 16 = 80 marks)
(Question No.11 is Compulsory)

11. a) i) Write about Bayesian linear regression in detail. (8)

    ii)Explain Linear basis Function models in detail. (8)

12. a) i) Explain the concept of bagging and boosting in detail. (10)

    ii) Write short notes on regression trees. (6)

    (OR)

    b) i) By giving an insight into Neural networks, discuss about Feed Forward Network functions and how the error can be propagated backwards in detail. (16)

13. a) i) Discuss about Expectation-Maximization algorithm with a clear example. (16)

(OR)

b) Describe few dimensionality reduction methods by highlighting the important features of each. (16)

14. a) i) Explain the Bayesian networks with an example. (8)

ii) Discuss about hidden markov models (HMM) in detail. (8)

(OR)

b) Write short notes on :

i) Markov random fields (8)

ii) Conditional random fields (4)

iii) Structural SVM (4)

15. a) Describe reinforcement learning and its types and Temporal difference learning with neat algorithm. (16)

(OR)

b) i) Explain Sample Complexity analysis and mistake bound analysis in detail. (8)

ii) Write short notes on : Monte Carlo Sampling method (8)

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Roll No. | | | | | | | | | | |

M.E / M.Tech (Full Time/Part Time) DEGREE END SEMESTER EXAMINATIONS, Nov/Dec 2015

COMPUTER SCIENCE AND ENGINEERING

II Semester

CP8201 Advances in Compiler Design

(Regulation 2013)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Name few algebraic simplification techniques .
2. Discuss the circumstances under which you would go for optimization
3. Justify the need for Forward substitution.
4. How do you eliminate Tail recursion?
5. What is an interference graph
6. Why do you think scheduling is a hard problem?
7. Justify the need for poison bit and its use
8. What are the metrics to estimate parallel applications.
9. What is a call string? Give example
10. Construct a call graph for the following functions:

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int g( int a)
{ b = f(a);
  c = f(b);
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int f(int a)
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Part – B (5 x 16 = 80 marks)

11. i. Explain the phases of the compiler with an example. [8]

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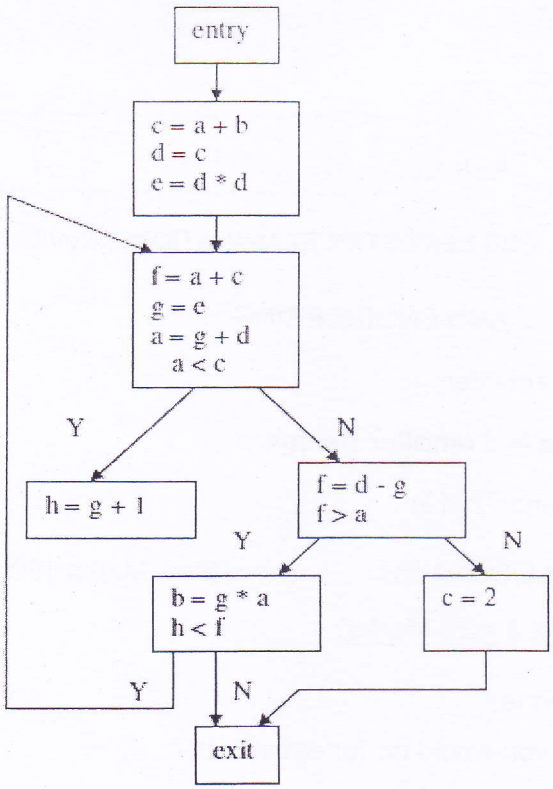
12. a) Consider the following flow graph. Identify the definitions that reach every block Explain clearly by means of data flow equations. [16]



(OR)

b) i. Perform the various loop optimizations and explain with an example. [8]

ii. Discuss procedure optimization with an example. [8]

13. a) i. Explain Peep-hole optimization in detail. Justify its use for instruction scheduling. [8]

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x := d * x
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(OR)

b) Discuss Brigg's and Chaitin's register allocation based on graph colouring. [16]

14. a) Write and explain the Region-based global scheduling algorithm. [16]

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b) i. Discuss the different kinds of spaces that are defined and used for optimizing loops involving arrays. [6]

Roll No. | | | | | | | | | | |

ii. Write and explain the Software-pipelining algorithm for acyclic graphs. [10]

15. a) Consider 2 relations r1(A,B) and r2(A,B) which are defined as follows [16]

r1

A	B
00	01
00	10
11	10

r2

A	B
00	11
10	01
11	10

Construct individual BDD's. Determine the union of the relations r1 and r2 and represent it using the BDD.

(OR)

b) i. Discuss about Just-in time compilation [8]

ii. Explain the issues in Inter-procedural analysis. [8]

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M.E / M.Tech (Full Time/Part Time) DEGREE END SEMESTER EXAMINATIONS, Nov/Dec 2015

COMPUTER SCIENCE AND ENGINEERING

II Semester

CP8201 Advances in Compiler Design

(Regulation 2013)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

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Part – B (5 x 16 = 80 marks)

11. i. Explain the phases of the compiler with an example. [8]

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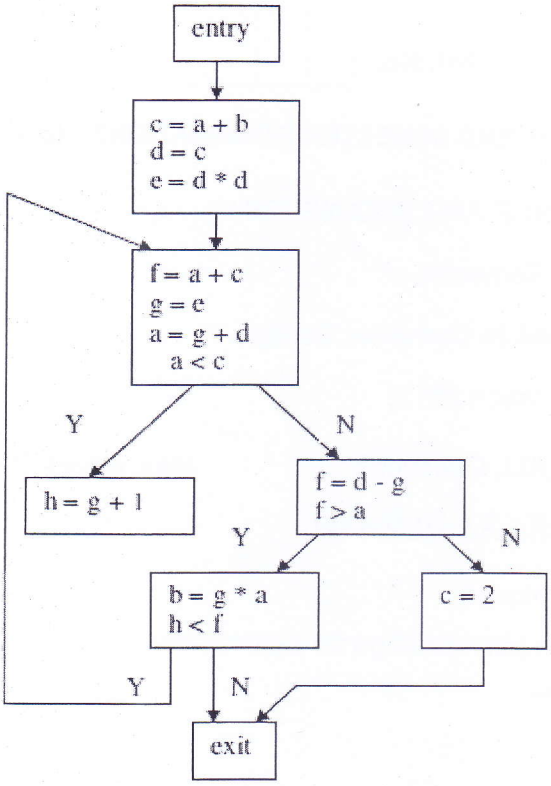

(OR)

b) i. Perform the various loop optimizations and explain with an example. [8]

ii. Discuss procedure optimization with an example. [8]

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r2

A	B
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Construct individual BDD's. Determine the union of the relations r1 and r2 and represent it using the BDD.

(OR)

b) i. Discuss about Just-in time compilation [8]

ii. Explain the issues in Inter-procedural analysis. [8]

Roll No. | | | | | | | | | | |

M.E (Part Time) END SEMESTER EXAMINATIONS, APRIL / MAY 2016

Computer Science and Engineering

Semester IV

CP8201 - Advances in Compiler Design

(Regulation 2013)

Time: 3 Hours Answer ALL Questions Max. Marks 100

Part - A (10 x 2 = 20 Marks)

1. What is the need for intermediate representations in compiler design?
2. Define a back edge and natural loop of a back edge.
3. Consider a code

```
a = i+1
b = 1+i
i = j
if  i+1 goto L1
c = i+1
```

Determine and eliminate redundant computation using appropriate optimization technique. Mention the technique used.

4. Define tail call and tail recursion. Give example
5. What is register allocation and register assignment?
6. What is the use of instruction scheduling?.
7. List out the code scheduling constraints.
8. What is affine access? Rewrite the following code to make affine access.

```
j = n ;
for(i = 0; i <= n ; i++) {
    z[j] = 0 ;
    j = j + 2 ; }
```

9. Differentiate between context-sensitive and context-insensitive interprocedural analysis
10. What is just-in-time compilation?

Part – B (5 x 16 = 80 Marks)

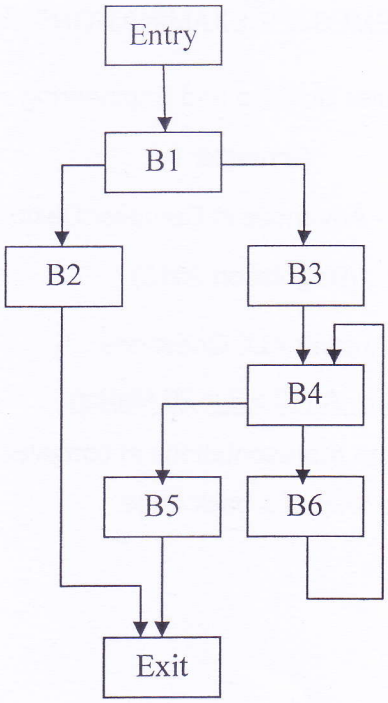
11. i) Consider the following grammar (4)

S→ (L) | a

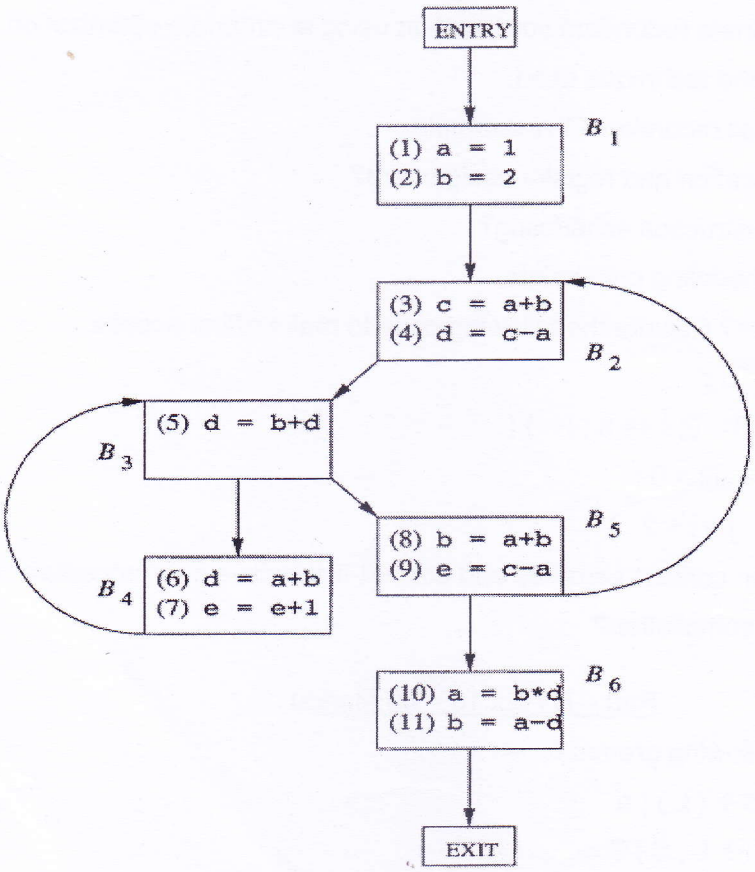
L→ L , S | S

Construct a predictive parsing table.

ii) Compute all the dominators of each node in a flow graph. Construct dominator tree for the following flow graph. (12)



12. a) Apply global common-subexpression for the following flow graph. (16)



(OR)

b) i) Explain copy propagation with example. (8)

ii) What are induction variables? Apply induction variable optimization for the code given in Question 13a.

13. a) Apply global register allocation by graph coloring for the following code with three registers. (16)

```
1        t1=202          8    t5 = 4 * i
2        i=1             9    t6 = t4 + t5
3    L1 : t2 = i> 100    10   *t6 = t1
4        if t2 goto L2   11   i = i + 1
5        t1 = t1 -2      12   goto L1
6        t3 = addr(a)    13   L2 :
7        t4 = t3 - 4
```

(OR)

b) i) Explain briefly the instruction selection by tree rewriting rules with example (8)

ii) Briefly explain the peephole optimizations. (8)

14. a) Define iteration spaces. Explain briefly the iteration spaces. (16)

(OR)

b) What is data reuse? Explain types of reuse with example (16)

15. a) i) Write short notes on the basic concepts of inter-procedural analysis. (8)

ii) Explain the need for inter-procedural analysis. (8)

(OR)

b) Describe briefly the context insensitive and sensitive inter-procedural analysis. (16)

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