

Department of Higher Education
University of Computer Studies, Hinthada
Fourth Year (B.C.Sc./B.C.Tech.)
Mid-Term Examination
English
March, 2018

Answer All questions

Time allowed: 3 Hours

QUESTION I

(20 marks)

Read the following passage and answer Questions 1-10.

- A. Today in Britain, there are 124 state universities, but only one private university-the University of Buckingham. Before the 19th century, there were only six universities: Oxford, Cambridge, Aberdeen, Edinburgh, Glasgow and St Andrews. Universities were usually linked to the Church and were established between the 13th and 15th centuries. They often have good reputations, beautiful old buildings, traditions and usually offer a wide range of courses.
- B. A number of universities were established in the 19th and early 20th centuries as a result of the industrial revolution and they began training highly skilled people for industry. These universities were generally established in major industrial centres such as Birmingham, Manchester, Newcastle and other big cities. Sometimes called modern or civic universities, these universities have the advantage of well-established libraries, academic specialities and accommodation that is close to campus.
- C. A number of new universities were established in the 1960s when children born after World War 2 entered the higher education system. The government decided to expand higher education to educate these students. The advantage of these universities is that they are well planned and most of the living and teaching facilities are on campus.
- D. Before 1992, higher education in the UK was split into polytechnics and universities. The polytechnics provided skilled people for the industries situated in their region – they focused on vocational and professional subjects. For many years, polytechnics didn't have the same influence as universities. However, by 1992, educational standards in polytechnics were as good as universities and many became universities. Many of these universities also offer diploma courses.
- E. These universities are made of several smaller colleges which come together to form a single university under a senate committee. There are only seven of these institutions in the UK – London University, Oxford and Cambridge are examples. Specialist colleges offer a range of courses in one discipline – for example agriculture, music, design or medicine. Some of these colleges may only offer postgraduate programmes. These colleges are usually small, with a limited number of students.
- F. Universities have different locations. The older universities often have teaching facilities and student accommodation situated close together. Students in these usually socialize in particular part of the city and there is a strong sense of community despite being in a large city. Some city campuses are situated on the outskirts of the city. These very often have the space to provide sports facilities and accommodation. They are also close enough to the city for students to enjoy city life. Some universities, notably Oxford and Cambridge, have a collegiate structure – that is, students are members of colleges within the university. These colleges are the centre of social life and academic life. Academic staff usually live at the college, and students and staff enjoy easy relationships.

Questions 1-6

Choose the correct headings for each paragraph from the list of headings below.

high	a	about	by	cooled	thickness	making
becomes	to	sides	it	rubbed	polished	coated
process	any	molten	than	since	continuously	

Glass, which has been made ---(1)--- the time of Mesopotamians and Egyptians, is little more ---(2)--- a mixture of sand, soda ash, and lime. When heated to ---(3)--- 1500 degrees Celsius, this ---(4)--- a molten mass that hardens when slowly ---(5)---. The first successful method for ---(6)--- clear, flat glass involved spinning. This ---(7)--- was very effective as the glass had not touched ---(8)--- surfaces between being soft and becoming hard, so ---(9)--- stayed perfectly unblemished, with a fire finish. However, the process took ---(10)--- long time and was labour intensive.

Nevertheless, demand for flat glass was very ---(11)--- and glassmakers across the world were making for a method of making it ---(12)---. The first continuous ribbon process involved squeezing ---(13)--- glass through two hot rollers, similar ---(14)--- an old mangle. This allowed glass of usually any ---(15)--- to be made non-stop, but the rollers would leave both ---(16)--- of the glass marked, and these would then need to be ground and ---(17)---. This part of the process ---(18)--- away around 20 per cent of the glass, and the machines were very expensive. The float process for making flat glass was invented---(19)--- Alistair Pilkington. This process allows the manufacturer of clear, tinted and ---(20)--- glass for buildings, and clear and tinted glass for vehicles.

QUESTION IV **(20 Marks)**

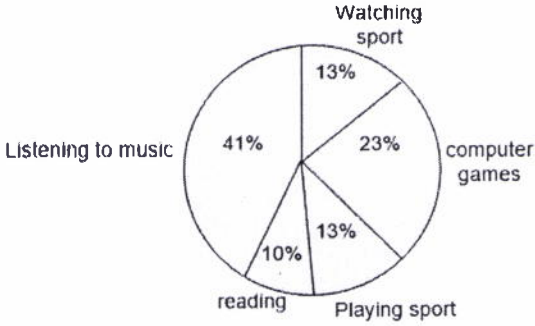
IV. (A). Answer the questions about yourself.

1. Are clothes important to you? (Why?)or(Why not?)
2. What kind of clothes do you usually wear?
3. Do you ever wear the traditional clothes of your country?
4. Do you like foreign fashion? (Why?)or(Why not?)
5. Most people accept that being fashionable plays an important role in life-would you agree?

IV. (B). You should spend about 20 minutes on this writing task.

The pie chart below shows the behaviour of spending time for teenagers in the UK in 2010. Summarize the information by selecting and reporting the main features, and make comparisons where relevant. (Write at least 150 words.)

Favourite leisure activities for teenagers



QUESTION V **(20 Marks)**

V. Write an essay on the following topic:

“The internet will bring about a new freedom of information and it gives many advantages for our lives.”

To what extent do you agree or disagree with the above statement? Write at least 250 words.

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Department of Higher Education
University of Computer Studies, Hinthada
Fourth Year (B.C.Sc.)
Mid-Term Examination
Operations Research (CS-401)
March, 2018

Answer All Questions.

Time Allowed: 3 Hours.

- 1.(a) A certain farming organization operates three farms of comparable productivity. The output of each farms limited both by the usable acres and by the amount of water available for irrigation. The data for the upcoming season is shown below:

Farm	Usable land (acres)	Water allocation (Acre Feet)
1	400	600
2	600	800
3	300	375

The organization is considering the crops for planting which differ primarily in their expected profit per acre and in their consumption of water. Furthermore, the total acreage that can be devoted to each of the crops is limited by the amount of appropriate harvesting equipment available.

Crop	Maximum acreage	Water consumption (acre feet)	Expected profit per acre
A	600	3	1000
D	500	2	750
E	325	1	250

In order to maintain a uniform workload among the farms, it is the policy of the organization that the percentage of the usable acreage planted be the same at each farm. However, any combination of the crops may be grown at any of the farms. The organization wishes to know how much of each crop should be planted at the respective farms in order to maximize expected profit. Formulate a linear programming model.

- (b) Use the graphical method to solve the following LP problem

$$\text{Maximize } Z = 3x_1 + 5x_2$$

subject to

$$x_1 \leq 4$$

$$2x_2 \leq 12$$

$$3x_1 + 2x_2 \leq 18$$

$$\text{and } x_1, x_2 \geq 0$$

- 2.(a) Use the simplex method to solve the following problem.

$$\text{Maximize } Z = 2x_1 + 3x_2$$

subject to

$$x_1 + 2x_2 \leq 30$$

$$x_1 + x_2 \leq 20$$

$$\text{and } x_1, x_2 \geq 0$$

(b) Use the Big – M method to solve the following problem

$$\text{Minimize } Z = 2x_1 + 3x_2 + x_3$$

subject to

$$x_1 + 4x_2 + 2x_3 \geq 8$$

$$3x_1 + 2x_2 \geq 6$$

$$\text{and } x_1, x_2, x_3 \geq 0$$

3.(a) Write the dual from the following LP problem

(i) $\text{Min } Z = x_1 + 2x_2$

subject to

$$2x_1 + 4x_2 \leq 160$$

$$x_1 - x_2 = 30$$

$$x_1 \geq 10$$

$$\text{and } x_1, x_2 \geq 0$$

(ii) $\text{Max } Z = x_1 - x_2 + 3x_3$

subject to

$$x_1 + x_2 + x_3 \leq 10$$

$$2x_1 - x_3 \leq 2$$

$$-2x_2 - 3x_3 \leq 6$$

$$\text{and } x_1, x_2, x_3 \geq 0$$

(b) Consider the following problem

$$\text{Maximize } Z = 3x_1 + 5x_2,$$

subject to

$$x_1 \leq 4$$

$$2x_2 \leq 12$$

$$3x_1 + 2x_2 \leq 18$$

$$\text{and } x_1, x_2 \geq 0$$

Solve by the original simplex method (in tabular form). Identify the complementary basic solution for the dual problem obtained at each iteration.

4. Use the dual simplex method for the following LP problem

$$\text{Maximize } Z = -4y_1 - 12y_2 - 18y_3$$

subject to

$$y_1 + 3y_3 \geq 3$$

$$2y_2 + 2y_3 \geq 5$$

$$\text{and } y_1, y_2, y_3 \geq 0$$

5.(a) Suppose that the demand for a product is 30 units per month and the items are withdrawn at a constant rate. The setup cost each time a production run is undertaken to replenish inventory is \$15. The production cost is \$1 per item, and inventory holding cost is \$0.30 per item per month.

(i) Assuming shortages are not allowed, determine how often to make production run and what size it should be.

(ii) If shortages are allowed but cost \$3 per item per month, determine how often to make and what size the order should be.

(b) Suppose that production planning is to be done for the next 5 months, where the respective demands are $r_1=2, r_2=4, r_3=2, r_4=2$ and $r_5=3$. The set up cost is \$ 4000, the unit production cost is \$ 1000, and the unit holding cost is \$300. Use the deterministic period-review model to determine the optimal production schedule that satisfies the monthly requirements.

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Department of Higher Education
University of Computer Studies, Hinthada
Fourth Year (B.C.Sc./B.C.Tech.)
Mid-Term Examination
Mathematics of Computing IV (CST-402)
March, 2018

Answer All Questions.

Time Allowed: 3 Hours.

1. (a) Apply the Improved Euler method to the initial value problem $y' = xy^2$, $y(0) = 1$, $h = 0.1$. Do 5 steps. Solve the problem exactly. Compute the errors. Use 6D.
 (b) Solve the initial value problem $y' = xy$, $y(0) = 1$, $h = 0.2$ by the Classical Runge–Kutta method of fourth order. Do 4 steps. Solve the problem exactly. Compute the errors. Use 5D.
2. (a) Solve the initial value problem $y' = 3y - 12y^2$, $y(0) = 0.2$, $h = 0.1$ by Adams–Moulton method for y_4 , y_5 and y_6 starting with 0.2109, 0.2198, 0.2269. Compute error.
 (b) Solve by the Euler's method for the system $y_1' = 2y_1 - 4y_2$, $y_2' = y_1 - 3y_2$, $y_1(0) = 3$, $y_2(0) = 0$, $h = 0.1$. Calculate the errors. Do 5 steps. Use 4D.
3. (a) Find maximum likelihood estimates for σ in the case of the normal distribution.
 (b) Find a 99% confidence interval for the mean of a normal population from the sample: Knoop hardness of diamond 9500, 9800, 9750, 9200, 9400, 9550. Find the length of confidence interval.
 (c) Find a 95% confidence interval for the *variance* of a normal population from the sample: Mean energy (keV) of delayed neutron group for uranium U^{235} fission: a sample of 100 values with mean 442.5 and variance 9.3.
4. (a) Assuming normality and known variance $\sigma^2 = 9$, test the hypothesis $\mu = 60.0$ against the alternative $\mu = 57.0$ using a sample of size 20 with mean $\bar{x} = 58.50$ and choosing $\alpha = 5\%$.
 (b) Graph the means of the following 10 samples (thickness of washers, coded values) on a control chart for means, assuming that the population is normal with mean 5 and standard deviation 1.55.

Time	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30
Sample	3	3	5	7	7	4	5	6	5	5
Values	4	6	2	5	3	4	6	4	5	2
	8	6	5	4	6	3	4	6	6	5
	4	8	6	4	5	6	6	4	4	3
- (c) If 10 flips of a coin result in 4 heads and 6 tails, can we assert on the 5% level that the coin is fair?
5. (a) Are oil filters of type A better than type B filters if in 11 trials, A gave cleaner oil than B in 7 cases, B gave cleaner oil than A in 1 case, whereas in 3 of the trials the results for A and B were practically the same?
 (b) Find the regression line of y on x for the data $(x, y) = (0, 4), (2, 0), (4, 5), (6, 9), (8, 10)$, and graph the given data as points on the same axes. Show the details of your work.

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Department of Higher Education
University of Computer Studies, Hinthada
Fourth Year (B.C.Sc.)
Mid-Term Examination
Database Management System (CS-404)
March 2018

Answer All Questions

Time Allowed: 3-Hours

1. Choose the correct answer(s) for the following statements. (20-marks)
1. Which of the following is the appropriate SQL command that can be used to undo any changes made to the database since the last commit?
(A) Close (B) Drop (C) Revoke (D) Rollback
 2. Which of the following is not a property of transactions?
(A) Atomicity (B) Concurrency (C) Isolation (D) Durability
 3. Checkpoints are a part of _____.
(A) Recovery measures (B) Security measures
(C) Concurrency measures (D) Authorization measures.
 4. Isolation in ACID properties means:
(A) Transaction preserve consistency (B) transaction's updates are concealed from all the rest
(C) Transaction survive from system crash (D) transaction must atomic
 5. A system is in a ___ state if there exists a set of transactions such that every transaction in the set is waiting for another transaction in the set.
(A) waiting (B) idle (C) Ready (D) Deadlock
 6. If transaction A holds an exclusive lock on tuple t, then a request from some transaction B for a lock either type on t.
(A) it will be granted (B) it will be denied (C) it will result in deadlock situation (D) none
 7. Locking is a _____ for concurrency problem in database.
(A) control mechanism (B) transaction recovery (C) isolation mechanism (D) none
 8. Data encryption is a solution mechanism to protect against _____.
(A) authorized user (B) unauthorized access
(C) physically removing part of the database (D) none
 9. Which subsystem checks a given access requests against the security constraints stored in the catalog?
(A) Authorization (B) classification (C) Both A and B (D) None of these
 10. In multi-level security, individual tuple within one relvar needs to label with _____.
(A) security level (B) constraints level (C) classification level (D) none
 11. The statement that is executed automatically by the system as a side effect of the modification of the database is _____.
(A) backup (B) assertion (C) recovery (D) trigger
 12. The following integrity constraints is referred to as:
CONSTRAINT SCK
COUNT(S) = COUNT (S {S#})
(A) type constraint (B) attribute constraint (C) relvar constraint (D) database constraint
 13. Table A is referenced by Table B with the use of a foreign key. When a row is update from Table A, all rows in Table B that refer to the row are also update simultaneously. Which of the following is the type of clause that can be used to specify such an SQL reference operation?
(A) CASCADE (B) CONSTRAINT (C) NO ACTION (D) REFERENCES

14. In distributed system, reconstructing the original relvar from the fragments is ____ for horizontal fragments.
 (A) Union (B) Restrict (C) Join (D) Project
15. The advantages of distributed systems are _____.
 (A) efficiency of processing (B) Reliability (C) Availability (D) All of the above
16. Location transparency allows for which of the following?
 (A) Users to treat the data as if it is at one location (C) Both A and B
 (B) Programmers to treat the data as if it is at one location (D) none
17. A distributed system cannot connected together by a variety of different communication network. (True/False)
18. The higher isolation level, the less interference, the lower isolation level the more interference. (True/ False)
19. Referential integrity means that the database must not contain any unmatched foreign key values. (True/ False)
20. In mandatory control, each user is given certain clearance level and each object is given a certain clearance level. (True/False)

2. (a) For data security, modern DBMSs typically support two broad approaches to protect the unit of data or “data object” that can range from an entire database to a specific tuple. Define these two approaches and how these approaches differ. (8-marks)

2. (b) Work through the RSA public key encryption scheme with $p=3$, $q=5$ and $e=11$ for plaintext BOOK. (Use $A=01$, -----, $Z=26$). (7-marks)

3. Consider the following relational schema:

<u>Table name</u>	<u>Attribute</u>
Sailors	(<u>sid</u> : int, sname: char, rating: int, age: int)
Boats	(<u>bid</u> : int, bname: char, color: char)
Reserves	(sid: int, bid: int, day: date)

3. (a) Write the **SQL statements** for each of the following conditions. (12-marks)

- Write the SQL statements to create the preceding relations, including appropriate versions of all primary keys and foreign key integrity constraints.
- What problems may occur without primary key and foreign key constraints?
- User “Ford” can access or change all data in all tables but user “sailors” can only retrieve the sailors table.
- User “Smith” can retrieve sailor’s information, but only for sailors who boat name is “Marine”.
- Remove the RETRIEVE privileges of user “Smith” on sailors table.

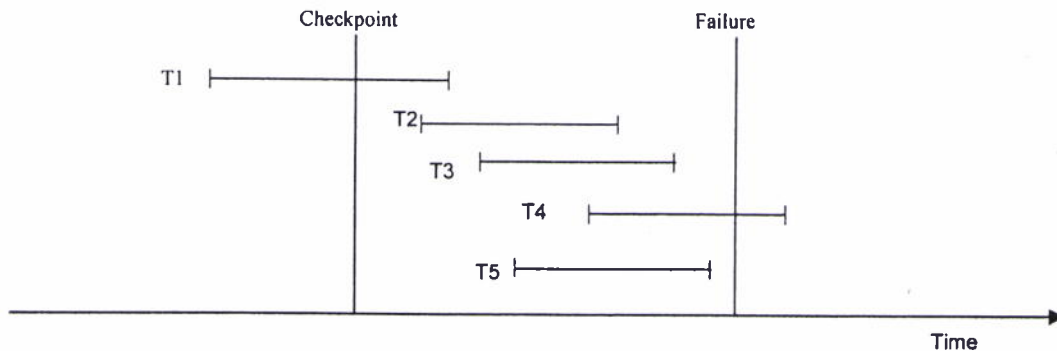
3. (b) Write appropriate constraints for each of the following condition. For each of your answers state where the constraints is a type constraint or relvar constraint or database constraint. (10-marks)

- The only legal boats colors are Green, Red, Blue and White.
- Every sailor has rating at least five.
- There must exist at least one red part.
- All sailors who reserve date is “2010-06-15”.

4. (a) 1. Define serializability. (5-marks)
 2. What is the two-phase locking protocol? (4-marks)
4. (b) One transaction is allowed to retrieve or update on a tuple that has been updated by another transaction but not yet committed by that other transaction. What problem can occur? How can it be solved? Explain with given case. (10-marks)

Transaction A	Time	Transaction B
-	T1	UPDATE y
UPDATE y	T2	-
-	T3	ROLLBACK

5. (a) Briefly explain how to recover the database from the transactions sequence when system failure occurs at time (tf) and check point is done at time (tc) shown in figure. Which transactions can place in redo and undo lists? (10-marks)



5. (b) One of the objective of DDBMS is DBMS independence. Briefly discussion on this objective that what DDBMS concepts are applicable for homogeneity and heterogeneity DBMS. (14-marks)

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Department of Higher Education
University of Computer Studies, Hinthada
Fourth Year (B.C.Sc.)
MidTerm Examination
Software Engineering (CS-405)
March, 2018

Answer All Questions

Time Allowed: 3 Hours

1. Choose the correct answer(s) for the following statements. (15-marks)
- (1) The principal stages for process improvement are
(A) process measurement (B) process analysis (C) process change (D) all of them
 - (2) _____ is a measure of the average length of words and sentences in documents.
(A) Length of code (B) Cyclomatic complexity (C) Fog index (D) Length of identifiers
 - (3) Three types of process metrics used in the measurement process are time metrics, resource utilization metrics and _____ metrics.
(A) size (B) cost (C) effort (D) event
 - (4) _____ describes the approach, resources and schedule used for system validation.
(A) Quality plan (B) Maintenance plan (C) Validation plan (D) Staff development plan
 - (5) To assess the efficiency and reliability of a program, we can use _____ metrics.
(A) predictor (B) dynamic (C) static (D) services
 - (6) Which of the following factors are affecting software pricing.
(A) market opportunity (B) contractual term (C) financial health (D) all of them
 - (7) _____ is used to help decide what measurements should be taken and how they should be used.
(A) CMM (B) GQM (C) P-CMM (D) CMMI
 - (8) In group _____, there is the right balance of skills, experiences and personalities in the team.
(A) organization (B) composition (C) cohesiveness (D) communication
 - (9) An example of a standard for configuration management plan is _____.
(A) ISO 9000 (B) ISO 9001 (C) IEEE 828-1998 (D) IEEE 828-2000
 - (10) _____ people are principally motivated by personal success and recognition.
(A) Task-oriented (B) Interaction-oriented (C) Self-oriented (D) Status-oriented
 - (11) The techniques of process analysis include questionnaires and interview, ethnographic studies.
(True / False)
 - (12) A system release is a version of the system that is distributed to customers. (True/False)
 - (13) Two types of configuration management workbench are open workbench and close workbenches.
(True / False)
 - (14) Quality planning involves monitoring the software development process to ensure that quality assurance procedures and standards are being followed. (True / False)
 - (15) The CMMI can be radically simplified as process areas, goals and practices. (True/False)
2. Write short notes for **Any FIVE** of the followings: (25-marks)
- (a) Milestones and Deliverables
 - (b) The risk management process
 - (c) Four critical factors in people management
 - (d) Cost estimation techniques
 - (e) Relationships between internal and external software quality attributes
 - (f) The key stages in software product measurement process
 - (g) Four fundamental configuration management activities
- 3.(a) Selecting staff in a software development organization is one of the most important project management tasks. What factors are governing staff selection? (5-marks)

- 3.(b) Software quality management provides an independent check on the software development process. Describe three main activities for software quality management. (5-marks)
- 4(a) The People Capability Maturity Model (P-CMM) can be used as a framework for improving the way in which an organization manages its human assets. List the five levels of P-CMM and describe the strategic objectives of this model. (10-marks)
- 4.(b) Process change involves making modifications to the existing process. What are the key stages in the process change process? Discuss about them. (10-mark)
- 5.(a) COCOMO II is a well-developed algorithmic cost model and widely used in a range of organizations. The value for the coefficient A is 2.94. The value for the exponent B is 1.17. The system size is 180,000 DSI.

Assume that RELY, CPLX, STOR, TOOL, SCED are the key cost drivers in this project.

For option A, assume that all key cost drivers have a nominal value of 1.

For option B, assume that all key cost drivers have maximum values.

For option C, assume that all key cost drivers have minimum values.

key cost drivers/ values	RELY	CPLX	STOR	TOOL	SCED
maximum	1.39	1.3	1.21	1.12	1.29
minimum	0.75	0.75	1	0.72	1

- (i) How are sub-models composed in COCOMO II ? In each sub-model, which is based on to estimate software effort? Explain with figure. (6- marks)
- (ii) Calculate the effort estimates for option A, B, C. (3-marks)
- (iii) Project cost drivers influence effort estimates. Compare these three effort estimates and discuss about them. (3-marks)
- (iv) There is 30% of schedule compression in this project. (SCED Percentage = 30%) Estimate the calendar time (TDEV) for these three options required to complete a project. (3-marks)
5. (b) Project scheduling is one of the most difficult jobs for a project manager. A project has been defined to contain the following list of activities along with their required time for completion.

Activity No.	Activity	Time (weeks)	Preceding Activity
1	Requirements Collection	5	-
2	Screen Design	6	1
3	Report Design	6	1
4	Database Design	2	2,3
5	User Documentation	5.5	4
6	Programming	5	4
7	Testing	3	6
8	Installation	1	5,7

- (i) Which activities are involved in project scheduling? To illustrate the project schedule, which graphical notations can be represented? (5-marks)
- (ii) Draw the Network Diagram for the above activities. (3-marks)
- (iii) The minimum time required to finish the project can be estimated by considering the longest path in the activity network (the critical path). Show the critical path and calculate the earliest expected completion time. (4-marks)
- (iv) Construct a Bar Chart for the above activities. (3-marks)

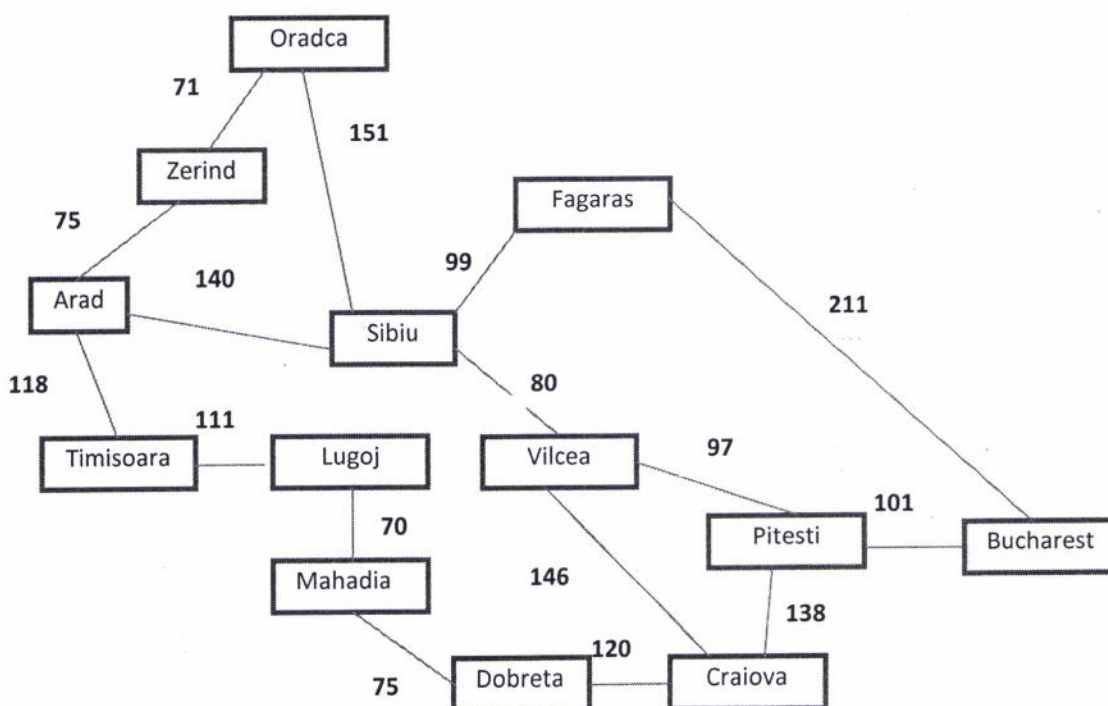
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Department of Higher Education
University of Computer Studies, Hinthada
Fourth Year (B.C.Sc.)
MidTerm Examination
Artificial Intelligence (CS-406)
March, 2018

Answer All Questions.

Time Allowed: 3 Hours

1. Define the following terms. (10 marks)
 - (a) agent program (c) autonomy
 - (b) rationality (d) reflex agent (e) state space
2. Answer **ANY FOUR** questions. (16 marks)
 - (a) Briefly explain depth-first search
 - (b) Differentiate between human and rationally for thinks.
 - (c) Greedy best-first search
 - (d) Genetic algorithms
 - (e) Describe the incremental formulation as a standard search problem for constraint satisfaction problem (CSP).
3. Write Short Notes on **ANY TWO** of the following: (14 marks)
 - (a) Deterministic vs stochastic (b) Episodic vs sequential (c) Goal-based agents
4. (a) For each of the following agents types, develop a PEAS description of the task environment:
 - (i) Taxi driver (ii) English tutor
4. (b) How many possible states are there in real world vacuum cleaner for two locations? Illustrate them. (15 marks)
5. (a) Determine task environment of the following agent types:
 1. Crossword puzzle 2. Air-con 3. Professor
5. (b) Give the states, initial state, successor function, goal test and path cost for route-finding problem. (15 marks)
6. Consider the Romania map.



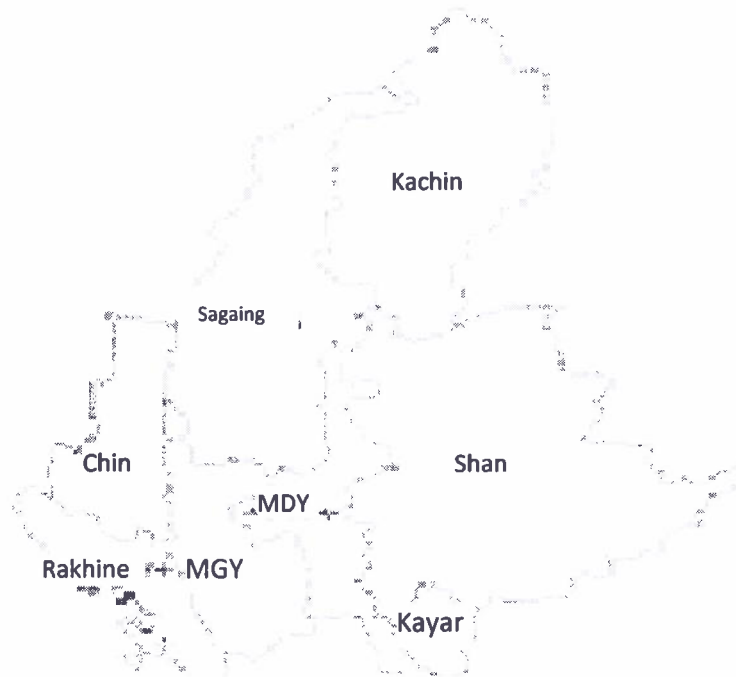
Arad	366	Mehadia	241
Bucharest	0	Oradca	380
Zerind	374	Fagaras	176
Sibiu	253	Timisoara	329
Lugoj	244	Vilcea	193
Pitesti	100	Dobreta	242
Craiova	160		

6.(a) Trace for A* search from Oradca to Bucharest.

6.(b) Trace for recursive best-first search from Oradca to Bucharest.

(15 marks)

7. (a) The following map is the northern part of Myanmar. Consider for the coloring this map can be viewed as a constraint satisfaction problem(CSP) start from MGY.



- (i) Draw a constraint graph.
- (ii) Define domains.
- (iii) Define the possible pair of neighboring region to have distinct colors.
- (iv) Write down the possible solutions.
- (v) Draw the search tree generated by simple backtracking for coloring map problem.
- (vi) Define the progress of map-coloring search with forward checking that is concerned with previous answers.

7.(b) Consider the FOUR+FIVE = NINE for cryptarithmic and draw the hypergraph.

(15 marks)

*****END*****