جامعة المنصورة – كلية العلوم
قسم الرياضيات
التاريخ : 25 / 12 / 2014 م
الدرجة الكلية : 80 درجة
الزمن : ساعتان

امتحان دور يناير 2015 م
برنامج : احصاء و علوم الحاسب
المستوى: الثالث
اسم المقرر : نظرية احصائية (1)
كود المادة : ر 333

أجب عن الأسئلة الآتية :-

السؤال الأول: أ) أخذت عينة عشوائية مكونة من 400 فرد من إحدى المدن فوجد أن المدخنين منهم 100 فرد . أوجد 95 % فترة ثقة لنسبة المدخنين بتلك المدينة . (10 درجات)

ب) لمعرفة تأثير دواء على قراءات ضغط الدم المرتفع. أخذت لذلك عينة عشوائية مكونة من 9 أشخاص و قيس ضغط كل منهم قبل تعاطى ذلك الدواء و بعد تعاطيه لمدة أسبوع فكانت النتائج كالتالى :

القراءة قبل تعاطى الدواء	170	180	160	175	150	180	185	190	195
القراءة بعد تعاطى الدواء	163	168	149	163	142	168	177	179	186

احسب 95 % فترة ثقة لمتوسط الانخفاض فى قراءة ضغط الدم الذى ينتج من استخدام هذا الدواء (15 درجة)

السؤال الثانى: أ) إذا كان الوسط الحسابى للتوزيع الطبيعى μ معلوم . أثبت أن المقدر $S^2=\frac{1}{n}\sum_{i=1}^{n}(X_i-\mu)^2$

مقدر كاف لتباين التوزيع الطبيعى σ^2 (10 درجات)

ب) إذا كانت أعمار المصابيح الكهربائية X (بالسنين) التي تنتجها احدي الشركات يتبع توزيعا" احتماليا" دالة كثافته الاحتمالية هي $f(x)=12\,x^2(1-x)$; $0\le x\le 1$ إذا أخذنا عينة عشوائية مكونة من 64 مصباح فما احتمال أن يكون متوسط أعمارها أقل من $7\frac{1}{2}$ شهر (15 درجة)

السؤال الثالث: أ) إذا كانت X_1 , X_2 , ⋯ , X_n عينة عشوائية من المشاهدات المستقلة المسحوبة من توزيع بواسون بمعلم λ . أثبت أن : $I_{SA}(\lambda)=\frac{n}{\lambda}$ (10 درجات)

ب) احسب حجم العينة اللازم سحبها من مجتمع حجمه 20000 لتقدير المتوسط لظاهرة معينة بخطأ لا يتعدى 2 بدرجة ثقة 99 % بفرض أن تباين تلك الظاهرة فى المجتمع 16 (10 درجات)

جـ) أوجد مقدر الإمكان الأكبر لنسبة النجاح P فى توزيع ذو الحدين إذا سحبنا عينة عشوائية حجمها n و رمزنا لعدد مرات النجاح بها بـ X (10 درجات)

$Z_{0.005}=2.58$, $Z_{0.025}=1.96$, $\Phi(1)=0.8413$, $t_{(0.025,9)}=2.262$, $t_{(0.025,8)}=2.30622$

مع التمنيات بالنجاح د. فاتن شيحه

Final Exam- Semester I - Year 2014/2015

SUBJECT: *Measure Theory* *(MATH 311)* Level-3	Faculty of Science Mathematics Department	DATE: 29 / 12 /2014 FULL MARK: *80* ALLOWED TIME: *2Hours*

Answer the following questions

Question-1 (22 marks)

1. Define the algebra of sets, the outer measure on an algebra Ω, the measurable set and the measurable function
2. Prove that if Ω is an algebra of sets and $A \in \Omega$ then $A^c \in \Omega$ and any ring with this property is also algebra
3. Prove that the set of all rational numbers is countable

Question-2 (21 marks)

1. Prove that If $\mu^*(A) = 0$ then $\mu^*(A \cup B) = \mu^*(B)$
2. Prove that the family of measurable sets is an algebra
3. Prove that if $\mu^*(E) = 0$, then E is measurable

Question-3 (19 marks)

1. Prove that every continuous function is measurable
2. Prove that if f and g are measurable on a set E then so are kf, f^2 and $mim(f,g)$

Question-4 (18 marks)

1. Find the length of the set $\bigcup_{k=1}^{\infty} \left\{ x : \frac{1}{k+1} \le x < \frac{1}{k} \right\}$
2. Show that the function

$$f(x) = \begin{cases} 1, & x \text{ is a rational number in } [0,1] \\ 0, & x \text{ is an irrational number in } [0,1] \end{cases}$$

Is not Riemann integrable in [0,1]

2. calculate Lebesgue integral for the function f(x)

$$f(x) = \begin{cases} 1, & x \text{ is a rational number in } [a,b] \\ 2, & x \text{ is an irrational number in } [a,b] \end{cases}$$

٣ / رياضيات
الاحصاء وعلوم الحاسب
(أ) تحليل عددي (٢١٣) -

Mansoura University, Faculty of Science, Mathematics Department

First term final exam –January, 2015 Math 313 for third year students Total Marks: 60 Time: 2 hours

يسمح باستخدام الآلة الحاسبة

Answer ALL questions. Show ALL your work. ALL questions carry equal marks.

QUESTION (1): (a) Prove: (i) $\Delta\nabla = \nabla\Delta$ (ii) $\nabla = \Delta E^{-1} = E^{-1}\Delta = 1 - E^{-1}$ (iii) $\mu = 1 + \frac{1}{4}\delta^2$.

(b) Evaluate $\Delta^4(x)_4$, if $h = 2$. (c) Express $g(x) = 3x^3 - 2x^2 + 7x - 6$ in the form $\sum_{j=0}^{3} a_j (x)_{3-j}$.

(d) Use the Horner's method to evaluate f (-1) and f′ (-1) for the polynomial f(x) given by:

$$f(x) = x^5 + 6x^4 + 11x^3 + 11x^2 + 6x + 1.$$

QUESTION (2): (a) Formulate the truncation error, $E_n(x)$ of the general interpolating polynomial.

(b) Find the inverse of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 3 & 6 \end{bmatrix}$ by using the Gauss-Jordan (G-J) method. Also find the LU factorization of its sub-matrix $S = \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$.

(c) Consider $B = \begin{bmatrix} p & 1 & 0 \\ q & 2 & 1 \\ 0 & 1 & 2 \end{bmatrix}$. Compute det (B) by applying the DETGTRI algorithm, then find all values of p and q for which: (i) B is singular. (ii) B is strictly diagonally dominant. (iii) B is positive definite.

(d) The equation $x^3 - 6x - 11 = 0$ has a root between 3 and 4 . By using inverse interpolation, find this root.

QUESTION (3): (a) Solve $u_n - 2u_{n-1} + u_{n-2} = 0$ given that $u_{-1} = 0$, and $u_0 = 1$.

(b) Prove that the Newton forward interpolating polynomial passing through the (n+1) data points (x_i, y_i), $i = 0, 1, 2, \ldots, n$ such that $x_i - x_{i-1} = h = \frac{x - x_0}{s}$ is given by $P(x) = \sum_{i=0}^{n} \frac{(s)_i}{i!} \Delta^i y_0$.

(c) Find y′ (1.5) and evaluate $\int_{x=2.0}^{x=4.0} y\,dx$ by applying the Simpson's rule from the following data:

x	1.5	2.0	2.5	3.0	3.5	4.0
y(x)	3.375	7.000	13.625	24.000	38.875	59.000

(d) Solve the following linear system of equations by applying the Gauss-Seidel (G-S) method.

$$-4x_1 - x_2 + 10x_3 = 24\ ,\ 10x_1 + 3x_2 + 2x_3 = 22,\ -x_1 + 10x_2 + x_3 = 22.$$

========== انتهت الأسئلة ==========

Kind regards Examiner: Prof. Dr. Moawwad El-Mikkawy

مواضيع مختارة في الحاسب ٣٤٧/

Mansoura Univ.
Faculty of Science 3rdYear: math.
Mathematics Dept. Date Jan.201
Subject:Math. Discrete math R 347 Time:2 hours

Answer the following

1] i- Use Euclid division algorithm to find gcd(114,18) Write a program for this algorithm.

ii- State fundamental theorem of arithmetic. Use it to prove that log 20 for the base 3 is noninteger. [27 marks]

2] i- Use Chinese remainder theorem to solve x=1 mod3, x=2 mod4.

ii-Use public key cryptography to send the word "gas".. [27 marks]

3]i- Define NP complete problem. Solve the following TSP [*564, 3*45, 98*3, 969*]

ii- Solve x=2 mod3, x=2 mod6. [26 marks]

الـــستويات - إحصاء وعلوم الحاسب - برمجة هيكلية (٢٠٢١)

Mansoura University Faculty of Science		Structured Programming Final Term Exam 1 January 2015 Time: 2 Hours

Question1

(1) Write a code segment that read four degrees from the user and display their total and minimum degree. (7 Points)

(2) Rewrite the above code segment to work with any number of degrees specified by the user without using array. (8 Points)

(3) Rewrite the above code segment to work with any number of degrees specified by the user using array. (8 Points)

(4) Suppose that the values of degree are 80, 70, 90 and 60, Trace your above answer. (7 Points)

Question2

(1) Draw a flowchart and Write a code segment that prints the following.

(10 Points)

1	15	110
2	25	210
3	35	310
4	45	410
5	55	510

(2) Write a program to search for a specific value inside an array of n values accepted from the user. The program calls a method that return true if the required element exists within the array, otherwise return false. (10 Points)

Question3. Write the output of the following code segment. (10 Points)

(1)

```
int x = 2, y = 3, z = 4, m = 3, n;
n = x-- + --z  * y-- >> m;
if (n > 1)
Console.WriteLine("Final");
else
 Console.WriteLine("Exam");
```

(2)

```
int x = 2,  z = 4, m = 2, n;
n = x++ * --z  - x << ++m;
for (int indx = n; indx >10 ; indx /=2)
Console.WriteLine("Final Exam ");
```

Good Luck

Mansoura University
Faculty of Science
Mathematics Department
Statistics and Computer Science

Database System
Term Exam
Thu: 22nd Jan, 2015
Dr. Bahaa Shabana

Answer the following questions.

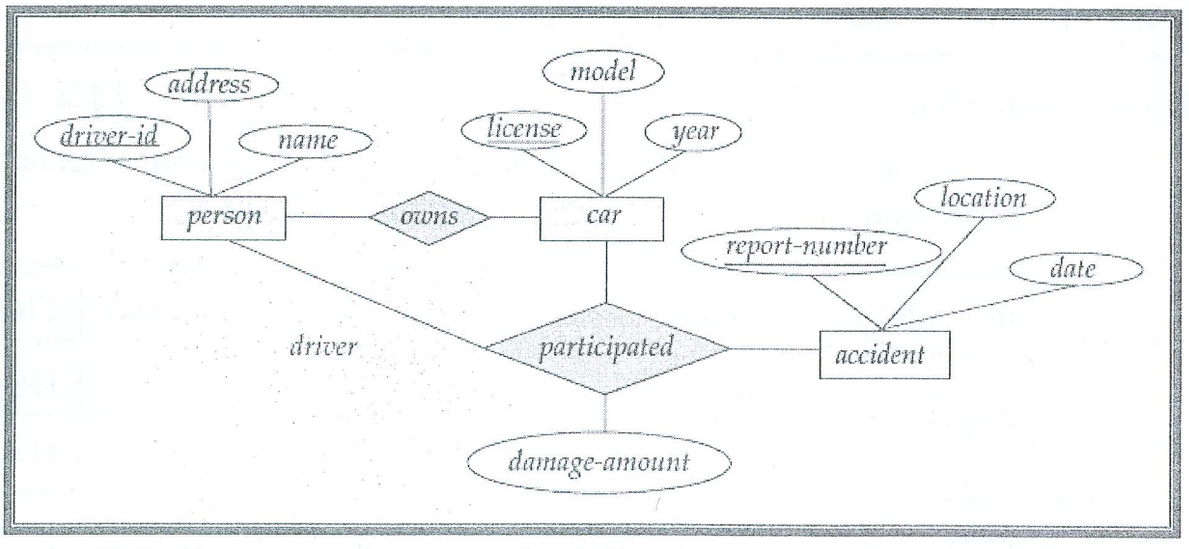
1. Write short note for each of the following: {10 marks}

1.1. Atomic domain.
1.2. Derived attribute.
1.3. Entity set.
1.4. Foreign key.
1.5. Metadata.
1.6. Primary key.
1.7. Referential integrity.
1.8. Transaction.
1.9. Trigger.
1.10. Weak entity.

2. Question Two {12 marks}

2.1. List the significant differences between a file-processing system and DBMS.
2.2. Define the concept of aggregation. Give two examples of where this concept is useful.
2.3. What is the degree of relationship set? Show example(s) using E-R model.

3. Question Three {10 marks}



Use the E-R diagram and answer the following:

3.1. List the entity sets and their primary keys.
3.2. Design a relational database corresponding to the E-R diagram.

(Please, see next page)

4. Question Four {16 marks}

Consider the employee database of opposite figure, where the primary keys are underlined.

employee (*person-name*, *street*, *city*)
works (*person-name*, *company-name*, *salary*)
company (*company-name*, *city*)
manages (*person-name*, *manager-name*)

Give an ***expression in SQL*** for each of the following queries:

4.1. Find the names of all employees who work for First Bank Corporation.
4.2. Find the names and cities of residence of all employees who work for First Bank Corporation.
4.3. Find the names, street addresses, and cities of residence of all employees who work for First Bank Corporation and earn more than $10,000.
4.4. Find all employees in the database who do not work for First Bank Corporation.
4.5. Find all employees in the database who earn more than each employee of Small Bank Corporation.
4.6. Find all employees who earn more than the average salary of all employees of their company.
4.7. Find the company that has the most employees.
4.8. Find the company that has the smallest payroll.

5. Question Five {12 marks}

5.1. Define the normalization. What is the main goal of database normalization?
5.2. Apply the normalization forms of the un-normalized table.

Student#	Advisor#	Advisor	Adv-Room	Class1	Class2	Class3
1022	10	Susan Jones	412	101-07	143-01	159-02
4123	12	Anne Smith	216	101-07	159-02	214-01

(End of Questions)

Good Luck

Dr. Bahaa Shabana