المستوى الثالث - الاحصاء وعلوم الحاسب - نظرية احصائية ٣٣٣

جامعة المنصورة – كلية العلوم
قسم الرياضيات
التاريخ : 23 / 12 / 2013 م
الدرجة الكلية : 80 درجة
الزمن : ساعتان

امتحان دور يناير 2014 م
برنامج : احصاء و علوم الحاسب
المستوى: الثالث
اسم المقرر : نظرية احصائية (1)
كود المادة : ر 333

أجب عن الأسئلة الآتية :-

السؤال الأول: أ) احسب حجم العينة اللازم سحبها من مجتمع حجمه 10000 شخص لتقدير نسبة المؤيدين لمشروع معين بخطأ لا يتعدى 0.03 و بدرجة ثقة 95 % (10 درجات)

ب) إذا كانت $x_1, x_2, \cdots x_n$ هى قيم عينة عشوائية مسحوبة من مجتمع له توزيع أسى بمعلم θ أى أن

$$f(x;\theta)=\frac{1}{\theta}\,e^{-\frac{x}{\theta}} \quad , \quad x>0 \quad , \quad \theta>0$$

أوجد مقدر الإمكان الأكبر للمعلم θ (10 درجات)

السؤال الثانى: أ) سحبت عينة حجمها 2 بدون إرجاع من المجتمع $\{2, 4, 6, 8\}$ فإذا رمزنا لوسط أمثال هذه العينة بالرمز $\bar{X}$ أوجد بطريقتين $E(\bar{X})$ و $Var(\bar{X})$ (10 درجات)

ب) إذا كانت $X_1 , X_2 , \cdots , X_n$ عينة عشوائية من المشاهدات المستقلة المسحوبة من مجتمع طبيعى وسطه الحسابى μ و تباينه σ^2 و إذا كان $\bar{X}$ هو مقدر المعلمة μ فأوجد دالة معلومات المقدر $I_{\bar{X}}(\mu)$ (10 درجات)

جـ) أخذت عينة عشوائية مكونة من 9 أسر فى منطقة بها 5000 أسرة فكان عدد أفراد أسر العينة كما يلى:

7 , 3 , 6 , 5 , 4 , 8 , 5 , 3 , 4 احسب 1) 99 % فترة ثقة لمتوسط عدد أفراد الأسرة بتلك المنطقة 2) 99 % فترة ثقة لعدد الأفراد الكلى بتلك المنطقة (10 درجات)

السؤال الثالث: أ) إذا كانت $X_1 , X_2 , \cdots , X_n$ عينة عشوائية من التوزيع $f(x;p)=p^x(1-p)^{1-x}$

أثبت أن $\hat{\theta}=\sum_{i=1}^{n} x_i$ مقدر كاف للمعلم p (10 درجات)

ب) أثبت أن الوسط الحسابى $\bar{X}$ هو أفضل المقدرات غير المتحيزة للوسط الحسابى μ للتوزيع الطبيعى (10 درجات)

جـ) إذا كانت أعمار المصابيح الكهربائية X (بالسنين) التي تنتجها احدي الشركات يتبع توزيعا" دالة كثافته الاحتمالية هي $f(x)=\frac{x}{2}$; $0 \le x \le 2$ إذا سحبت عينة عشوائية حجمها 32 مصباح من انتاج هذه الشركة فما احتمال أن يكون متوسط أعمارها أقل من 1.1 سنة (10 درجات)

$\varphi(-2.8)=0.0026$, $\varphi(0.93)=0.1762$, $t_{(0.005,9)}=3.250$, $t_{(0.005,8)}=3.355$

$Z_{0.005}=2.58$, $Z_{0.025}=1.96$, $t_{(0.025,9)}=2.262$, $t_{(0.025,8)}=2.306$

مع التمنيات بالنجاح د. فاتن شيحه

المستوى الثالث . الرياضيات / ٣١١

الاحصاء بلوم - نظرية القياس

Final Exam- Semester I - Year 2013/2014

SUBJECT: *Measure Theory* *(MATH 311)* Level-3	Faculty of Science Mathematics Department	DATE: 26 / 12 /2013 FULL MARK: *80* ALLOWED TIME: *2Hours*

Answer the following questions

Question-1 **(20 marks)**

1. **Define the Algebra Ω of subsets of a set X. prove that, if Ω is an algebra and $A \in \Omega$, then $A^c \in \Omega$, and any ring Ω with this property is an algebra**
2. **Define the outer measure on an algebra Ω. And prove that If $\mu^*(A) = 0$, then $\mu^*(A \cup B) = \mu^*(B)$**

Question-2 **(20 marks)**

1. **Define the measurable set. And prove that if E is measurable set then the complement E^c is also measurable**
2. **Prove that, the cantor set is measurable and find its measure**

Question-3 **(20 marks)**

1. **Define the measurable function. And prove that every continuous function is measurable**
2. **Prove that if f_1 and f_2 are measurable on [a,b] then so are $\{f_1\}^2$, $f_1.f_2$ and $Min\{f_1, f_2\}$**

Question-4 **(20 marks)**

1- **Show that the function**

$$f(x) = \begin{cases} 1, & x \text{ is an irrational number in} [-4,4] \\ -2, & x \text{ is a rational number in} [-4,4] \end{cases}$$

a) **Is not Riemann integrable in [-4,4]**

b) **Is Lebesgue integrable in [-4,4] and find the value of Lebesgue integral of f(x) in [-4,4]**

2- **Prove that if f(x)=c then $\int_E f(x)dx = c\mu(E)$**

Level: 3 Program: Mathematics + Statistics & Computer Science Numerical Analysis (1) (313)	Faculty of Science Mathematics Department	1st Semester Time:2 hour Date: 30/12/2013

Answer the following Questions:

Question (1)

(1) Derive Newton-Raphson method, and use it to find an approximation to $\sqrt[3]{25}$ correct to within 10^{-3}. (10 Marks)

(2) Define Lipschitz condition. Show that the following initial-value problem has a unique solution. Use Runge-Kutta method of order four to approximate it.

$$y' = y - t^2 + 1, \quad 0 \le t \le 1, \quad y(0) = 0.5, \text{ with } h = 0.2$$ (10 Marks)

Question (2)

(1) State and prove under what condition(s) the function $g(x)$ has a unique fixed point in $[a, b]$. (10 Marks)

(2) Show that the sequence defined by

$$x_n = \frac{1}{2}x_{n-1} + \frac{1}{x_{n-1}}, \quad \text{for } n \ge 1,$$ (10 Marks)

converges to $\sqrt{2}$ whenever $x_0 > \sqrt{2}$

Question (3)

(1) State and derive Newton Forward-Difference Formula. (5 Marks)

(2) By using the following data (15 Marks)

x	1	1.05	1.1	1.15	1.2
$f(x)$	0.1924	0.2414	0.2933	0.3492	0.3943

Find an approximate value for

(i) $f(1.01), f(1.09), f(1.18)$, (ii) $f'(1.1)$, using 3 and 5-point formula

(iii) $\int_1^{1.2} f(x)\,dx$, $n = 3, 4$.

Best Wishes; *Dr. Tamer Mohamed El-Azab*

المستوى الثالث - الاصدار علوم/اكاديمي - نظم قواعد البيانات ٣٤٤

Mansoura University Faculty of Science Dept. of Mathematics Database Systems		3rd year Time: 2 Hours Date: 2/1/2014 Maximum 60 Marks

Answer the following questions:

Question #1 (20 Marks)

a) What are the advantages of database systems?

b) State the advanced database applications?

c) Clarify the difference between database systems and file systems?

d) Define the following:

1. Primary key 2. Foreign key 3. Mobile database 4. Cardinality

e) What is the relation between databases and computer based information system?

f) State the standard database types?

Question #2 (20 Marks)

a) State the different types of relations and give example for each one?

b) What are the major DBMs components?

c) Draw the block diagram of database lifecycle?

d) State the steps of making DBMs for a given project?

e) How can the overall logical structure of a database be expressed graphically?

f) What is the difference between:-

1. Replication and Duplication

2. Homogenous and heterogeneous Distributed Database

Question #3 (20 Marks)

a) For the following two relations, determine union, intersection, (R1-R2), and Cartesian Product?

Relation (R1)

Emp_ID	Emp_Name	Address	Birth Date
2324	Ali	Mansoura	17/11/1987
4547	Naser	Tanta	22/02/1989
6549	Sami	Cairo	12/12/1987
7653	Yaser	Sudan	10/08/1986
8975	Hany	Cairo	04/10/1981

Relation (R2)

Emp_ID	Emp_Name	Address	Birth Date
3546	Fayez	Alexandria	24/05/1988
6549	Sami	Cairo	12/12/1987
7292	Mohamed	Sinai	03/04/1989
8975	Hany	Cairo	04/10/1981
9990	Saber	Port Said	11/11/1988

b) Perform vertical fragmentation for relation (R1) and horizontal fragmentation for relation (R2)?

c) Assume that relation **(R1)** is stored on site **SITEE** and relation **(R2)** is stored on site **SITEL**, write SQL code to count the number of employers in both tables?

d) Perform normalization for the following table?

Project code	Project Title	Project Manager	Project Budget	Employee No.	Employee Name	Department No.	Department Name	Hourly Rate
Pc010	PS	Tarek	450000	S1001	Ahmed	L004	IT	19.00
Pc010	PS	Tarek	450000	S1003	Ali	L023	Security	20.25
Pc010	PS	Tarek	450000	S2001	Amal	L004	IT	17.00
Pc045	SS	Hamed	600000	S2009	Basem	L004	IT	18.75
Pc045	SS	Hamed	600000	S1001	Ahmed	L004	IT	21.25
Pc045	SS	Hamed	600000	S3018	Hany	L028	Database	22.50
Pc045	SS	Hamed	600000	S4205	Mazen	L028	Salary	16.25
Pc064	HRS	Mona	350000	S3018	Hany	L028	Database	17.50
Pc064	HRS	Mona	350000	S2001	Amal	L004	IT	19.50
Pc064	HRS	Mona	350000	S9943	Yaser	L009	HR	21.75

Mansoura University *Faculty of Science* *Math. Dept.*		*Exam : 9th Jan. 2014* **Time : 2 hours** **3rd year (Stat. & Comp. Sci.)**

Subject : Probability Theory

Answer the following questions: ***(Total Mark 80)***

(1) a- If X_1 and X_2 are independent exponential random variables with respective parameters λ_1 and λ_2.

Find (i) the distribution of $Z = X_1 / X_2$.

(ii) $P(X_1 < X_2)$. (12 M.)

b- If X is a random variable with finit mean μ and variance σ^2, then for any value $k > 0$, prove that $P\{|x-\mu| \geq k\} \leq \frac{\sigma^2}{k^2}$. (8 M.)

(2) a- If X_1 and X_2 are independent random variables having Poisson distribution with parameters λ_1 and λ_2. Find the probability distribution of the random variable $Y = X_1 + X_2$. (10 M.)

b- Suppose the joint density of X and Y is given by

$$f(x,y) = \frac{e^{-x/y}e^{-y}}{y} \qquad 0 < x < \infty, 0 < y < \infty$$

Find i) $E(X|Y=y)$ ii) $P(X \succ 0|Y=y)$.. (10 M.)

(3) a- For any two random variables X and Y , show that

$Var(X+Y) = Var(X) + Var(Y) + 2Cov(X,Y)$. (5 M.)

b- If X is a binomial random variable with parameters n & p.

Find i - $\phi_X(t)$, the characteristic function.

ii- Var (X). iii- α_3, the skewness. (15 M.)

(4) a- If X is a random variable having the moment (GF) $M_X(t)$ and μ'_n is the n–th moment, prove that $\mu'_n = \frac{d^n}{dt^n} M_X(t)|_{t=0}$. (7 M.)

b- For any random variable X, prove that :

$$E(X) = \int_0^\infty P\{X > x\}\, dx - \int_0^\infty P\{X < -x\}\, dx .$$ (7 M.)

c- A proup of n men throw their hats into the center of a room. The hats are mixed up and each man randomly selects one. Find the expected number of men that select their own hats (called matches). (6 M.)

Best wishes.

Prof. Beih El-Desouky

مواضيع فتاة الحاسب ٣٤٧

Mansoura University
Faculty of Science
Mathematics Department
Statistics and Computer Science

Selected Subjects (GIS)
Term Exam
Thu: 16th Jan, 2014
Dr. Bahaa Shabana

Answer the following questions.

1. **Write short note for each of the following:**
   - 1.1. GIS.
   - 1.2. Datum.
   - 1.3. GPS.
   - 1.4. UTM.
   - 1.5. TIN.
   - 1.6. Topology

2. **Question Two**
   - 2.1. Explain the difference between raster data and vector data.
   - 2.2. Name the three types of simple features used in GIS and their geometric properties.
   - 2.3. What are the main advantages of using shapfiles?

3. **Question Three**
   - 3.1. Describe the three levels of approximations of the shape and size of the Earth for GIS applications.
   - 3.2. Describe the three types of map projections by the projection or developable surface.

4. **Question Four**

Arc-coordinate list

Arc#	x,y Coordinates
1	(0,9) (2,9)
2	(2,9) (8,9)
3	(2,9) (2,6) (4,4) (4,2)
4	(8,9) (8,7) (7,5) (6,2) (4,2)
5	(4,2) (1,2)
6	(4,2) (4,0)

Arc-node list

Arc#	F-node	T-node
1	11	12
2	12	13
3	12	15
4	13	15
5	15	14
6	15	16

   - 4.1. Use the above tables (coverage data format tables) for:
     - 4.1.1. Draw a sketch map which represents Arcs.
     - 4.1.2. Draw arrows determining the direction for each arc.
   - 4.2. Name the produced polygons as (100, 101, 102, etc.) and Use your produced sketch to create a table which represents left and right polygon for each arc.

5. **Question Five**
   - 5.1. What are the different types of computer memories? Write short notes about each type.
   - 5.2. Write a class in C++ programming language, called myWatch. This includes the methods: setTime, showTime, and a constructor.

(End of Questions)

Good Luck

Dr. Bahaa Shabana

المستوى الثالث - الاحصاء وعلوم الحاسب - برمجة هيكلية د ٢٤١

Final Exam
Structured Programming – Math 341
3rd Level
Mathematics Department
Faculty of Sciences
Mansoura University
Questions in 3 Pages – Marks: 60
23rd January 2014
Exam Duration: 2 Hours
Answer ALL the Questions

Question One ..... (20 Marks)

1. Compare between Procedural Programming and Object Oriented Programming. In your opinion, what is the most convenient programming approach of them?
2. Java Programming Language is Distributed. Mention three distribution techniques supported by Java. (Hint: RMI, CORBA, URL).
3. Java Programming Language is Mutli-Threaded. Discuss Threading and illustrate your answer with a figure.
4. Java Programming Language is Secure. Java technology programs run, uses security measures to protect programs from attacks. Discuss four used security techniques.
5. Compare between Platform Dependent and Platform Independent Programs. To which category do Java programs belong?
6. Java technologies include Java SE, Java ME, Java EE, and Java Card. What are the differences between them?
7. IDE stands for: Integrated Development Environment. List three IDEs that can be used to write Java programs. What are the main functions provided by IDEs?
8. What do you know about: UML?
9. What is the difference between Class and Object?
10. Describe some common causes of Syntax Error.

Question Two ..... (20 Marks)

Given the following System Description, answer the following questions:

Product life cycle is an iterative process used to develop new products by solving problems. Student Information System (SIS) is the information system responsible for managing students' data at the university. A typical student record in the SIS might includes the student's ID, social security number, name, age, gender, address, email, username, password, date of birth, faculty, university status, and department.

SIS might actually include a history of the student's interaction with tutors, peers, and other significant learning conversations.

1. List and describe the Seven Product Life Cycle Stages.
2. Analyze the previous problem using Object Oriented Analysis. Answer must contain the following information:
    a. Identify problem domain.
    b. Identify the objects.
    c. Define Attributes and Operations.
3. Design and Model (Draw) the required classes to solve the previous problem.
4. Write the suitable code that reflects your analysis of the problem.
5. Write the code required to test the classes you have written.

Question Three .....Chose the Correct Answers..... (20 Marks)

1. The Java programming language is said be platform- independent because:
    a. Compiled code runs on multiple platforms with few or no modifications
    b. It does not allow pointers to be used to manipulate memory
    c. The format of a compiled Java program is CPU-specific code
    d. It is multi-threaded
2. The Java technology product group that is designed for developing applications for consumer devices is _____.
    a. Java SE JDK
    b. Java ES SDK
    c. Java EE SDK
    d. Java ME SDK
3. Choose the response that represents two different properties of an object:
    a. Methods and operations
    b. The problem domain
    c. Attributes and operations
    d. Variables and data
4. Which of the following statements is true?
    a. An object is a blueprint for a class.
    b. An object and a class are exactly the same.
    c. An object is an instance of a class.
    d. An attribute cannot be a reference to another object.
5. Select the class declaration that adheres to the class-naming guidelines.
    a. class Shirt
    b. public Class 501Pants c. public Shirt
    c. public Class Pants

6. The variable declaration public int myInteger=10; adheres to the variable declaration and initialization syntax.
    a. True
    b. False
7. Which statement is true?
    a. There are eight primitive types built in to the Java programming language.
    b. byte, short, char, and long are the four integral primitive data types in the Java programming language.
    c. A boolean type variable holds true, false, and nil.
    d. long=10; is a valid variable name that adheres to the variable declaration and initialization syntax.
8. Which of the following lines of code instantiates a Boat object and assigns it to a sailBoat object reference?
    a. Boat sailBoat = new Boat();
    b. Boat sailBoat;
    c. Boat = new Boat()
    d. Boat sailBoat = Boat();
9. Which of the following statements are true? (Choose all that apply.)
    a. The dot (.) operator creates a new object instance.
    b. The String class provides you with the ability to store a sequence of characters.
    c. The Java API specification contains documentation for all of the classes in a Java technology product.
    d. String objects cannot be modified.
10. What is the purpose of the else block in an if/else statement?
    a. To contain the remainder of the code for a method
    b. To contain code that is executed when the expression in an if statement is false
    c. To test if an expression is false
11. Which of the following sentences is suitable for testing a value in a switch construct?
    a. The switch construct tests whether values are greater than or less than a single value.
    b. The switch construct tests against a single variable.
    c. The switch construct tests the value of a float, double, or boolean data type and String.

<< End of Questions >>

Best wishes,
Dr.Haitham A. El-Ghareeb