

Taibah University College of Computers science and Engineering الاحتمالات والاحصاء الهندسي STAT 305 YM2 – Midterm		Date: Tue 25 Oct. 2023 Time: 12:00 — 13:00 Total Marks: 30
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Question 01

[10 Marks]

1. In the 2008 General Social Survey (GSS), 2020 respondents answered the question, "How many children have you ever had?" The results were

No. children	0	1	2	3	4	5	6	7	8+	Total
Count	521	323	524	344	160	77	30	19	22	2020

- Is the variable, number of children, **categorical or quantitative**?
- Is the variable, number of children, **discrete or continuous**?
- Add **proportions and percentages** to this frequency table.

2. A student wants to examine the distribution of his scores as shown on his academic transcript. To this end, he constructs the stem-and-leaf plot of his records:

6	588
7	01136779
8	1223334677789
9	011234458

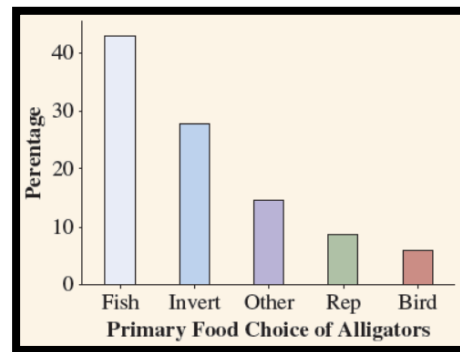
- Identify the number of courses validated by the student, his minimum and maximum scores.
- Sketch a dot plot for this data.

Question 02

[20 Marks]

- It describes how the observations fall across the range of possible values"
 - Correlation
 - Distribution**
 - Regression
 - Variance
- A listing of possible values for a variable, together with the number of observations for each value"?
 - Frequency Table**
 - Histogram
 - Scatter Plot
 - Box Plot
- Identify the type of variable represented by "The number of social media accounts you have (Facebook, Twitter, LinkedIn, Instagram, etc.)" in statistical terms.
 - Categorical
 - Discrete**
 - Continuous
 - None of the above
- Considering the variable "Choice of diet (vegan, vegetarian, neither)," how would this variable be classified in statistical terms?
 - Categorical**
 - Quantitative
 - Neither Categorical nor Quantitative

For questions 15 to 7 — For 219 alligators captured in four Florida lakes, researchers classified the primary food choice (in volume) found in the alligator's stomach in one of the categories



- Is primary food choice categorical or quantitative?
 - Categorical**
 - quantitative
- Which is the **modal category** for primary food choice?
 - Fish**
 - Invert
 - Bird
 - Rep
- About what percentage of alligators had fish as the primary food choice?
 - 43**
 - 25
 - 18
 - 5
- In the following data set, what additional number should be included in the data set to yield a mean of 10?
5, 8, 10, 12, ____
 - 8**

- b) 10
- c) 12
- d) 15

Based on records of automobile accidents in a recent year, the Department of Highway Safety and Motor Vehicles in Florida reported the counts who survived (S) and died (D), according to whether they wore a seat belt (Y = yes, N = no). The data are presented in the contingency table shown.

Outcome of auto accident by whether subject wore seat belt			
Wore Seat Belt	Survived (S)	Died (D)	Total
Yes (Y)	412,368	510	412,878
No (N)	162,527	1,601	164,128
Total	574,895	2,111	577,006

9. what is the total number of individuals who survived the accidents?
 - a) 412,368
 - b) 162,527
 - c) 574,895
 - d) 577,006
10. what is the probability of an individual dying (D) in an auto accident, denoted as $P(D)$?
 - a) $2,111/577,006$
 - b) $510/412,878$
 - c) $1,601/164,128$
 - d) $412,368/574,895$
11. Estimate the probability that an individual did not wear a seat belt, denoted as $P(N)$.
 - a) $412,878/577,006$
 - b) $164,128/577,006$
 - c) $510/412,878$
 - d) $1,601/164,128$
12. Given the data, estimate the probability that an individual did not wear a seat belt and died in the accident, denoted as $P(N \text{ and } D)$.
 - a) $1,601/577,006$
 - b) $1,601/164,128$
 - c) $2,111/577,006$
 - d) $510/412,878$
13. what is the conditional probability of an individual dying (D) given that they did not wear a seat belt (N), denoted as $P(D|N)$?
 - a) $1,601/164,128$
 - b) $1,601/577,006$
 - c) $2,111/577,006$
 - d) $510/412,878$
14. Using the data, what is the conditional probability of an individual surviving (S) given that they wore a seat belt (Y), denoted as $P(S|Y)$?
 - a) $412,368/412,878$
 - b) $412,368/574,895$
 - c) $510/412,878$
 - d) $162,527/164,128$
15. If $P(A) = 0.5$ and $P(B) = 0.4$, and A and B are mutually exclusive events, what is $P(A \cup B)$?
 - a) 0.9
 - b) 0.2
 - c) 0.7
 - d) 0.5
16. If $P(A) = 0.3$ and $P(B) = 0.6$, and A and B are independent events, what is $P(A \cap B)$?
 - a) 0.18
 - b) 0.9
 - c) 0.5
 - d) 0.2

17. If $P(A) = 0.4$, $P(B) = 0.5$, and $P(A \cap B) = 0.2$, what is $P(A \cup B)$?
 - a) 0.7
 - b) 0.9
 - c) 0.5
 - d) 0.3
18. If $P(A) = 0.5$, $P(B) = 0.4$, and A and B are mutually exclusive, what is $P(A \cap B)$?
 - a) 0.0
 - b) 0.2
 - c) 0.5
 - d) 0.9
19. If $P(A) = 0.5$, $P(B) = 0.4$, and $P(A \cup B) = 0.6$, what is $P(A \cap B)$?
 - a) 0.2
 - b) 0.3
 - c) 0.4
 - d) 0.1
20. Alice and Bob are playing a game with a six-sided die. Alice will win if the die shows a 1 or 2, and Bob will win if it shows a 3 or 4. If the die shows a 5 or 6, they will roll again. What is the probability of Alice winning on the first roll?
 - a) $1/2$
 - b) $1/4$
 - c) $1/6$
 - d) $1/3$

Name

ID

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1 (a) (b) (c) (d) 13 (a) (b) (c) (d)

2 (a) (b) (c) (d) 14 (a) (b) (c) (d)

3 (a) (b) (c) (d) 15 (a) (b) (c) (d)

4 (a) (b) (c) (d) 16 (a) (b) (c) (d)

5 (a) (b) (c) (d) 17 (a) (b) (c) (d)

6 (a) (b) (c) (d) 18 (a) (b) (c) (d)

7 (a) (b) (c) (d) 19 (a) (b) (c) (d)

8 (a) (b) (c) (d) 20 (a) (b) (c) (d)

9 (a) (b) (c) (d) 21 (a) (b) (c) (d)

10 (a) (b) (c) (d) 22 (a) (b) (c) (d)

11 (a) (b) (c) (d) 23 (a) (b) (c) (d)

12 (a) (b) (c) (d) 24 (a) (b) (c) (d)

BEST WISHES

Dr. Mostafa A. Elhosseini
 Professor of AI – Taibah University
<https://youtube.com/drmelhosseini>