Note: Please **SUBMIT** each question individually before ending the exam to receive score
Answer Submitted Submission Pending

TIME REMAINING
0:56:44

End Exam

Question Set

Question Set

Time Crisis (Asymptotic Analysis)

1 point possible (graded, results hidden)

Time Complexity

What is the time complexity of the following code?

```
count = 0;
for (int i = n/2; i <= n; i++) {
    for (int j = 1; j+n/2 <= n; j++) {
        for (int k = 1; k <= n; k = k*2) {
            count++;
        }
    }
}
```

- ◯ n^3
- ◯ n^2
- ◉ n^2*log(n)
- ◯ 2n*log(n)

Submit

Bicycle Ride

1 point possible (graded, results hidden)

Tom rides his bicycle to town from village everyday. Unknown to him, the bicycle tyre had a minor puncture. Pumping the tyre full of air takes normally 28 minutes but because of the leak from puncture, it took Tom 16 minutes more.

If the tyre is pumped full, how long would it take the tyre to completely deflate because of the leak?

- ◯ 82.0
- ◯ 77.0
- ◯ 74.0
- ◯ 81.0

Submit

Save

Page Fault in Memory

1 point possible (graded, results hidden)

Consider we have memory of size **10 Bytes** and Frame size of **2 Bytes**. **10** Pages which are represented by Upper Case letters as A, B, C, D, E, F, G,

H, I and J are accessed by a program in the following order:
C -> G -> G -> I -> B -> C -> B -> C -> H -> B

Find the Number of Page Faults that occurred in above case if LRU (Least Recent Used) replacement Algorithm is used.

Hint: Assume Page Size is equal to Frame size

- ◯ 5
- ◯ 7
- ◯ 4
- ◯ 2

Submit Save

Find no. of rows

1 point possible (graded, results hidden)

Find the no. of rows

Table A

Id	Name	Age
1	Azam	52
2	Rehman	23
3	Usman	11
4	Wajid	90

Table B

Id	Name	Age
1	Haseeb	60
2	Azam	14
3	Usman	73
4	Wajid	75

Consider the above tables A and B. How many rows the following SQL query will return?

```
SELECT * FROM A WHERE  A.age > ALL (SELECT B.age FROM B WHERE  B.name = "Usman")
```

In above query `ALL` operator returns TRUE if all of the subquery values meet the condition.

If you are on mobile device, scroll to view full query

- ◯ 3
- ◯ 1
- ◯ ERROR IN SQL QUERY
- ◯ 0

Submit Save

Profit/Loss (Calculation)

1 point possible (graded, results hidden)

Ali sells a bag to Ahmad at a profit of 48% while the cost price of bag is 200 RS. Then Ahmad sells the bag back to Ali at a loss of 48%. In this deal:

- ◯ Ali neither loses nor gains

- ◯ Ali makes profit of 71%
- ◯ Ali makes profit of 96%
- ◯ Ali makes profit of 68%

Submit

Save

Covid Test Prediction

1 point possible (graded, results hidden)

The covid-19 is spreading at a rate of 5% in the population. So govt has decided to test randomly 1000 people.
But the test is not 100% accurate, however from the past data we have some analytics about the accuracy of the test as follow:

- If a person is **COVID Positive**, there is a probability of 0.82 the test will predict correctly.
- If a person is **COVID Negative**, there is a probability of 0.21 the test will predict incorrectly.

The test report shows a Mr. Ali is **COVID Positive**. Considering the above analytics of test accuracy, What is the probability of Mr. Ali being **COVID Positive** actually?

Round the answer to 2 decimal points.

- ◯ 0.17
- ◯ 0.5
- ◯ 0.88
- ◯ 0.12

Submit

Save

Find the Pattern

1 point possible (graded, results hidden)

(13 - x) * (13 + x) = 160
(19 - x) * (19 + x) = 352
The above examples follow the certain pattern. Find the pattern by caculating value of x and calculate required value of below expression.
(24 - x) * (24 + x) = ?

- ◯ 518
- ◯ 567
- ◯ 598
- ◯ 548

Submit

Save

Candy Party

1 point possible (graded, results hidden)

Three friends (say A, B, and C) decided to have a party. Consider following conversation between them:
A says: If B gives me half of his money and C gives me one third of his money, we can buy six candies.
B says: If A gives me one fourth of his money and C gives me half of his money, we can buy three candies.
C says: I don't need B's money. If A gives me all of his money, we can buy three candies.

Can you find out approximately how much money each of these friends has? Assume the cost of candy is Rs. 32.00 and each friend also includes

all of his/her money in buying candies.

Use numbers upto 2 decimal points.
Answers are given in Rs. (Rupees).
It is possible to have answers in negative numbers.

- ◯ [A, B, C] = [244.2, 143.62, -98.16]
- ◯ [A, B, C] = [234.98, 110.67, -52.17]
- ◯ [A, B, C] = [152.18, 126.42, -36.19]
- ◯ [A, B, C] = [171.84, 89.28, -75.84]

Submit Save

Count word groups of consonants and vowels

1 point possible (graded, results hidden)

Out of 11 consonants and 3 vowels, how many words of 11 consonants and 2 vowels can be formed?

- ◯ 18681062400
- ◯ 1491376463216640000
- ◯ 6466521600
- ◯ 6227020803

Submit Save

Recursive Call

1 point possible (graded, results hidden)

```
function func(num1, num2)
{
        if(num1 % 5 == 0)
                return num1 + num2
        return func(num1+1, num2/2)
}
```

What will this function call return? func(55, 81)

- ◯ 136
- ◯ 17
- ◯ 68
- ◯ 55

Submit Save

Determine Logical Output (Bitwise Operations)

1 point possible (graded, results hidden)

Suppose we have the following two binary strings i.e.

A 1010101111001000

A=1010101111001000

B=1110110000101110

What will the output of the operation (A XNOR B)?

- 1101010001010001
- 1010001110010000
- 1011100000011001
- 1000011100110001

Submit

Save

Stack & Queue

1 point possible (graded, results hidden)

Consider, you have following array: **[15, 4, 20, 1, 18, 14, 18, 20, 5, 7, 15, 6, 6, 5, 18]**

Create an empty stack **S** and queue **Q**. Pick **even values** from array which are present at **odd indexes** and store those values into stack **S** and those indexes into queue **Q**. Create another empty stack **R**. Dequeue one element from **Q** and push it into stack **R**, then pop one element from **S** and push it into stack **R**. Perform this operation until both **S** and **Q** get emptied.

What is the resultant stack **R**?

Note: Read stack as top → bottom.

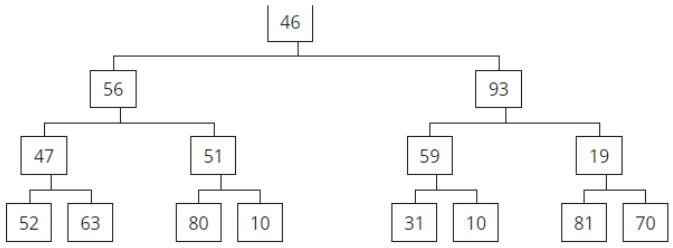
- [4, 11, 14, 7, 6, 20, 1, 5]
- [4, 11, 14, 7, 1, 6, 20, 5]
- [4, 11, 14, 7, 20, 5, 6, 1]
- [4, 11, 14, 7, 20, 5, 1, 6]

Submit

Save

Pre-order Tree Traversal

1 point possible (graded, results hidden)



What is the **pre-order** traversal of the given tree?

If you are on mobile, scroll to view full tree

- [46, 56, 47, 52, 63, 51, 80, 10, 93, 59, 31, 10, 19, 81, 70]
- [52, 63, 47, 80, 10, 51, 56, 31, 10, 59, 81, 70, 19, 93, 46]

- ◯ [52, 47, 63, 56, 80, 51, 10, 46, 31, 59, 10, 93, 81, 19, 70]
- ◯ [46, 56, 93, 47, 51, 59, 19, 52, 63, 80, 10, 31, 10, 81, 70]

Submit

Save

Singly Linkedlist

1 point possible (graded, results hidden)

I hope you have an idea about the traversal of a Singly Linked List. In every node of the Linked List there is a value and next pointer.

Dryrun this code with the given Linked List and answer the following question. Note that, **start** is pointing at the **head** therefore, **start->value** is equal to **4** and **start->next->value** is equal to **8**.


```
x = start
while x != null do
    y = x->next
    while y != null AND ( y->value MOD x->value == 0 ) do
        y_old = y
        y = y->next
        y_old = null
    end while
    x->next = y
    x = x->next
end while
```

The length of input Linked List is 6, **what will be the updated length of the Linked List?**

If you are on mobile device, scroll the above linked list to see the nodes

- ◯ 4
- ◯ 2
- ◯ 5
- ◯ 6

Submit

Save

Dry Run

1 point possible (graded, results hidden)

Consider the following array to be passed to the function below:
[289, 4, 221, 48, 295, 6, 263, 204]

```
FUNCTION foo(arr) {
        IF (length(arr) == 1)
                return arr[0]
        ENDIF

        last = arr.pop()
        x = foo(arr)

        IF (x > last)
                return x
        ELSE
                return last
        ENDIF
}
```

Dry run the pseudo-code given above and Select the Output of the function

Note: array.pop() returns last element of the array and removes it from the array

- ◯ 442
- ◯ 263
- ◯ 295
- ◯ 217

Submit

Save

Compound Interest

1 point possible (graded, results hidden)

Azan invested some money in a savings account paying interest at the rate of 20% compounded annually. After how many years will his savings exceed **3 times** of his initial investment?

- ◯ 9
- ◯ 10
- ◯ 8
- ◯ 7

Submit

Save

Encryption

1 point possible (graded, results hidden)

In Cryptography, **encryption** is the process of encoding information. This process converts the original representation of the information, known as plaintext, into an alternative form known as ciphertext.

Suppose, Alice wants to send a message to Bob and she does not want anyone else except Bob to read the message. So, she uses the encryption program which will be given below. But before that, some words on map data structure.

A **Map** is an abstract data structure that stores key-value (k,v) pairs. Like dictionary-python, object-javascript, Java/C++ Map classes etc. Given below is a table of key-value pairs which will be used in the given encryption program. For example: given a variable key = 'a', NUMBER_MAP[key] will output 1 and SUBSTITUTION_MAP[key] will output 'z'.

Key	Number Map Value	Substitution Map Value	Key	Number Map Value	Substitution Map Value
a	1	z	b	2	x
c	3	v	d	4	t
e	5	r	f	6	p
g	7	n	h	8	l
i	9	j	j	10	h
k	11	f	l	12	d
m	13	b	n	14	y
o	15	w	p	16	u
q	17	s	r	18	q
s	19	o	t	20	m
u	21	k	v	22	i
w	23	g	x	24	e
y	25	c	z	26	a

```
// Encryption Program
function encrypt(text) {
```

```
function encrypt(text) {
  alphabets = "abcdefghijklmnopqrstuvwxyz";       // lowercase alphabets string
  total_alphabets = alphabets.length;             // length or size of alphabet string
  output = "";    // initialize with empty string

  // loop over characters of input text string
  // % = modulus
  for index, character in text {
          if index % 2 == 0 {
                  my_index = (NUMBER_MAP[character] + 3 - 1) % total_alphabets;
                  output += alphabets[my_index];  // append to output string
          } else {
                  ouput += SUBSTITUTION_MAP[character];   // append to output string
          }
  }

  return output;
}
```

Alice is encrypting the following plaintext (input): **grrwefdftd** using the above program. Find out the ciphertext (output) that Bob is going to receive.

If you are on mobile, scroll to view full table

- ◯ jqughpgpwt
- ◯ jquyugwmto
- ◯ jquhdwvuvt
- ◯ jqunfhlvpa

Submit

Save

Next Number in the Sequence

1 point possible (graded, results hidden)

Find the next number in this sequence: `20, 22, 27, 36, 51`

- ◯ 96
- ◯ 76
- ◯ 73
- ◯ 59

Submit

Save

Trace the Output

1 point possible (graded, results hidden)

Consider the following algorithm:

```
PROCEDURE algorithm(array_one, array_two) {
  DECLARE array_three[array_one.length]
  FOR (DECLARE i = 0; i < array_one.length; i++) {
    IF (i % 2 == 0) {
      array_three[i] = (array_one[i] + array_two[i + 1])
    } ELSE {
      array_three[i] = (array_one[i] + array_two[i - 1])
    }
  DECLARE sum = 0
  for (DECLARE i = 0; i < array_three.length i++) {
    sum = sum + array_three[array_three[i] % array_three.length]
  }
  return sum
```

```
}
```

What will be the value of the variable `sum` if we call `algorithm([6, 6, 2, 1], [4, 3, 8, 7])` ?

- ◯ 39
- ◯ 41
- ◯ 35
- ◯ 40

Submit

Save

Translation

1 point possible (graded, results hidden)

You are given the task of translating a word of an alien origin into another alien language by applying the following rules:

1. If there's a vowel in the first half of the word, it is to be replaced with the next vowel in the alphabet. [a, e, i, o, u] (This list is cyclic, i.e., the previous vowel of a is u, and the next vowel of u is a).
2. If there's a vowel in the second half of the word, it is to be replaced with the 2nd next vowel from the current one (e.g. the second next vowel of a is i. This is cyclic as well)
3. Every second consonant in the list is to be replaced with the next consonant in the alphabet. (e.g. previous consonant of j is h, next consonant of h is j. This is cyclic as well)

The word is **MYOUAMHPI**

- ◯ MZUAIMJPU
- ◯ LZUAIMJPU
- ◯ MYUAIMJPU
- ◯ MZUAILJPU
- ◯ MZUAIMJNU
- ◯ MZUUIMJPU

Submit

Save

Percentage Error

1 point possible (graded, results hidden)

Naveed miscalculated his total percentage as **88**% in which he mistakenly used his **Computer Science** marks as **27** instead of **42**. What absolute percentage error is introduced in his total percentage if there are **7** subjects of **50** marks each?

Note: Round off answer upto 2 decimal places and write absolute percentage error.

- ◯ 4.92
- ◯ 5.03
- ◯ 3.5
- ◯ 4.29

Submit

Save

Kadane's Algorithm

1 point possible (graded, results hidden)

What is the output of the following function?
If my_arg = [4, -2, 3, 9, 2, 2] (i.e., pass as parameter to my_function)

```
Initialize:
    max_so_far = INT_MIN
    max_ending_here = 0

Loop for each element of the array
    (a) max_ending_here = max_ending_here + a[i]
    (b) if(max_ending_here > max_so_far)
            max_so_far = max_ending_here
    (c) if(max_ending_here < 0)
            max_ending_here = 0

return max_so_far
```

- ◯ 15
- ◯ 16
- ◯ 19
- ◯ 18

Submit

Save

Greater Numbers (Permutation)

1 point possible (graded, results hidden)

How many 4 digits numbers can be made using only 0, 1, 2, 3, 4, 5 which are greater than 3541? (digits can be repeated)

- ◯ 442
- ◯ 447
- ◯ 455
- ◯ 432

Submit

Save

General Mental Ability (Data Interpolation)

1 point possible (graded, results hidden)

A Business owner Alex, got a call for an urgent business meeting and he had to drive through a road which did not have network coverage. He immediately left in his Car driving at constant speed of **87 km/h**. After Driving for **1 hours 48 minutes**, He took a **30 minutes** break at Gas pump and continued his Journey with same constant speed.
After **3 hours 41 minutes** of the departure of Alex, His Secretary Tracy found out that Alex missed a very critical file at office. Since she cannot call him, She has to deliver the file herself to make sure Alex gets the file in Time. If Tracy departs after **3 hours 47 minutes** from the departure of Alex and drive with a constant speed of **115 km/h**, After how much time her car can catchup with Alex's Car on Road?

Note: For sake of ease, consider there is no acceleration, even when they start driving or stop

- ◯ 11 hours 48 minutes
- ◯ 10 hours 15 minutes
- ◯ 10 hours 24 minutes

- ◯ 8 hours 53 minutes

Submit

Save

Find the Number (Numeric Sequence)

1 point possible (graded, results hidden)

What will be the next number in the following sequence?

12, 36, 24, 64, 60, 100, 96, 144, 132

- ◯ 177
- ◯ 196
- ◯ 12
- ◯ 245

Submit

Save

FCFS CPU Scheduling

1 point possible (graded, results hidden)

If the CPU scheduling policy is First Come First Serve, calculate the average waiting time for the processes defined below.

Process ID	Arrival Time	Burst/Execution Time
0	10	6
1	11	13
2	7	4
3	6	2

- ◯ 2.5
- ◯ 0.5
- ◯ 1.75
- ◯ 6.5

Submit

Save

Decode

1 point possible (graded, results hidden)

Consider the following table:

```
   1  3  2  8
7  A  B  C  D
8  E  F  G  H
2  I  J  K  L
3  M  N  O  P
5  Q  R  S  T
4  U  V  W  X
6  Y  Z
```

If:

1. H has a code of 24

2. Q has a code of 23
3. Y has a code of 32

What will be the **sum** of the codes **T**, **U**, and **G**?

Note: The answer could be either negative or positive

- ◯ 76
- ◯ 77
- ◯ 79
- ◯ 80

Submit

Save

SQL (Group By)

1 point possible (graded, results hidden)

Table: employees

id	name	city	salary
28	Sameer	Multan	5500
30	Heera	Karachi	6500
51	Hatim	Karachi	5500
124	Arslan	Rawalpindi	5000
165	Yusra	Faisalabad	5000
90	Anas	Rawalpindi	7000
147	Fatima	Multan	6500
160	Naveed	Karachi	5000

How many rows does the result of the following SQL query contain?

SELECT city, SUM(salary) AS total_salary
FROM employees
GROUP BY city **HAVING** SUM(salary) < 15000 **ORDER BY** city **DESC**

- ◯ 1
- ◯ 3
- ◯ 2
- ◯ 0

Submit

Save

Ratios

1 point possible (graded, results hidden)

The ratio of Abbas's salary to Ali's salary is 6:5 The ratio of Ali's salary to Ayesha's salary is 16:17. If Abbas earns 96 lacs how many lacs does Ayesha earn?

- ◯ 85
- ◯ 86
- ◯ 87
- ◯ 84

Submit

Save

Logical Reasoning

1 point possible (graded, results hidden)

36 students out of a class of 100 drank coffee and 88 students drank tea (it is possible for a single student to drink both tea and coffee, or neither). What is the **minimum possible** number of students who drank both tea and coffee?

- 52
- 36
- 88
- 24

Submit

Save