Jahangirnagar University
Department of Computer Science and Engineering
3rd Year 1st Semester B.Sc. (Hons.) Mid-Term Examination – 2023
Course Title: Operating System Course No: CSE-309
Time: 1 Hour *Full Marks: 20*

1. Question No. 1 will be based on *CO1*.
State the technique for avoiding the data inconsistency problem. 2

2. Question No. 2 will be based on *CO2*.
Explain the superiority of synchronization hardware over other synchronization methods. 4

3. Question No. 3 will be based on *CO3*. 4
Consider 5 processes arriving at time 0 as

Process	Burst Time
P_1	9
P_2	25
P_3	4
P_4	8
P_5	12

FCFS

Calculate ~~minimum~~ average waiting time for RR (q=10) CPU scheduling.

Question No. 4 will be based on *CO4*.

4. Analyze the dining philosopher problem, and select the conditions for which it can avoid the deadlock problem altogether. 4

Question No. 5 will be based on *CO5*.

5. Evaluate with the necessary evidence that Google's Chrome browser was designed to address the issues for using a multiprocessor architecture. 6

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1. Explain that the resource allocation graph is not able to find the existence of a deadlock among the processes with multiple resources. (*CO4*) 10
2. Consider the following snapshot of a system: (*CO5*) 10

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P0	2 0 0 1	4 2 1 2	3 3 2 1
P1	3 1 2 1	5 2 5 2	
P2	2 1 0 3	2 3 1 6	
P3	1 3 1 2	1 4 2 4	
P4	1 4 3 2	3 6 6 5	

Test whether the request from process P4 : (0, 0, 2, 0) can be granted immediately?

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1. Consider a paging system with a page table stored in memory.
   c. If a memory reference takes 50 nanoseconds, how long does a paged memory reference takes?
   d. If we add TLBs, and 75 percent of all page-table references are found in the TLBs, what is the effective memory reference time? (Assume that finding a page-table entry in the TLBs takes 2 nanoseconds, if the entry is present.)

2. Consider the following page reference string:

   7, 2, 3, 1, 2, 5, 3, 4, 6, 7, 7, 1, 0, 5, 4, 6, 2, 3, 0, 1

   Assuming demand paging with three frames, how many page faults would occur for the following replacement algorithms?
   b. FIFO replacement b. LRU replac...

CSE-303 Computer Graphics
Class Test – 01

Total Marks: 10 Time: 30 min

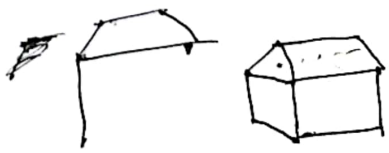
1. Explain with a diagram, how a display processor works? 2
2. Differentiate between Raster scan and Vector scan. 2
3. Write short notes on direct coding. 2
4. Suppose we want to draw a line from right endpoint to left endpoint using DDA algorithm. Calculate the successive values of y and x for $\Delta x = -1$ and $\Delta y = -1$ respectively in different condition of slope m. 4

CSE-303: Computer Graphics
Class Test – 02

Total Marks: 20 Time: 45 min

1. Calculate pixel positions and draw that made up the ellipse having initial point (0, 8) with radius 8. 8
2. Draw a 6th order C curve. 3
3. Write short notes on boundary fill techniques. 3
4. Find the transformed point, P', caused by rotating P= (3, 2) about the origin through an angle of 45°. 6

CSE-303: Computer Graphics
Class Test – 03



Total Marks: 20 Time: 50 min

1. Differentiate between Faceted shading and Phong shading. 3
2. Describe briefly 3D geometric rotation with figures and equations. 8
3. Write short notes on Point clipping. 3
4. Describe orthographic projection with suitable figure. 6

Jahangirnagar University
Department of Economics
1st Tutorial Examination
Full Marks: 30

Answer any two (2) questions of the following:

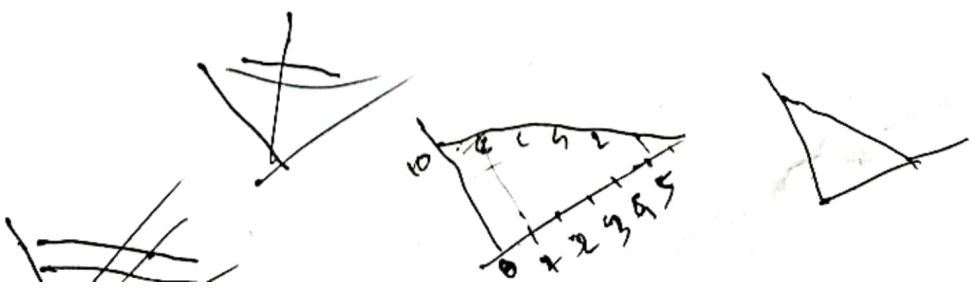
1. (a) What is production possibilities frontier (PPF)? Draw an economy's PPF between Cookies and Milk production. 3
   (b) Indicate an inefficient point. Why this point inside the PPF is inefficient? 3
   (c) Indicate an efficient point. Why this point on the PPF is efficient? 3
   (d) Indicate an unattainable point. Why this point outside the PPF is unattainable? 3
   (e) What happens to this frontier if disease kills half of the economy's cows? 3

2. (a) Distinguish between a movement along the demand curve and shift of the demand curve. 5
   (b) What will be the effect in the demand for Tea if the price of Coffee increases? Explain with appropriate diagram. 5
   (c) Discuss any FOUR determinants that can shift the demand curve with relevant diagrams. 5

3. Hypothetical supply and demand schedules for ice cream are shown in the accompanying table.

Price,$	Quantity demanded millions/year	Quantity supplied, millions/year
10	10	4
12	9	5
14	8	6
16	7	7
18	6	8
20	5	9

   (a) Plot the supply and demand curve in a same diagram. 6
   (b) Find the equilibrium price and quantity. 2
   (c) Suppose in one summer, the weather is extremely hot as there happens to be a heat wave. In addition to that during the same summer, a cyclone destroys part of the sugarcane crop and drives up the price of sugar ; which is an essential ingredient for Ice cream production. How do these events affect the market (demand and supply) equilibrium for ice cream? Explain with the diagram. 7



Jahangirnagar University
Department of Economics
2nd Tutorial Examination
Full Marks: 30
Answer all the questions:

1. Define inelastic demand, elastic demand, perfectly inelastic demand, perfectly elastic demand and unit elastic demand. 6
2. Suppose the price of pizza is $20.50 and the quantity demanded is 9 pizzas per hour. If the price falls to $19.50 and the quantity demanded increases to 11 pizzas an hour, then calculate the price elasticity of demand for pizza by using normal method (both direction). Now use mid -point method to calculate price elasticity of demand for pizza. Why mid-point method is preferable over normal method? 12
3. Explain the relationship between total revenue (TR) and price elasticity of demand. 6
4. Explain the relationship between marginal cost (MC) and average total cost (ATC). 6

Jahangirnagar University
Department of Economics
3rd Tutorial Examination
Full Marks: 30
Time: Half of an hour

Answer any one (1) question of the following:

1. Suppose in a hypothetical economy, three goods are produced: Mango, Banana and Chicken. The quantity of output and prices of mango, banana and chicken are given in the following Table.

	Output			Price, Tk/Unit		
	2014	2015	2016	2014	2015	2016
Mango	150	160	165	105	110	115
Banana	510	515	530	7	8	10
Chicken	315	320	325	110	115	125

(a) Define nominal and real GDP. Calculate the nominal GDP for the year 2014, 2015 and 2016. Suppose, 2015 is the base year, and then calculate the real GDP for the year 2014, 2015 and 2016. Define growth rate. Calculate the growth rate of real GDP for the year 2015 and 2016.

(b) Define GDP deflator. What does it measure? According to the GDP deflator, how much prices have increased for the year 2015 and 2016.

2. A consumer's basket of goods for a hypothetical economy includes 4 Pizzas, 6 Pepsis and 8 Hamburgers. Use the Table below to answer the following questions. Take 2013 as the base year.

Year	Price of Pizza(Tk.)	Price of Pepsi(Tk.)	Price of Hamburger(Tk.)
2011	120	60	100
2012	125	65	110
2013	130	70	115

(a) Calculate the cost of the Consumer's basket for each of the years given.
(b) Calculate the CPI for each of the years given.
(c) From the CPI, calculate the inflation rate for the year 2012 and 2013.
(d) Explain the problems in measuring the cost of living.
(e) Provide a comparative discussion between GDP deflator and CPI.

Computer Architecture
Classtest-2 **Roll:** **Time: 30 mins.**

1. Define Hardware and software approaches of programming with necessary diagram 4
2. Identify top-level view of computer components using diagram. 4
3. Name and define different types of registers in a processor. 4
4. Explain the basic instruction cycle with interrupt using diagram. 4
5. Draw different computer modules with input and output signals. 4

Case Study: Hotel Reservation System – A Brief Journey

Sharmin, an frequent traveler, decides to book a weekend getaway at a coastal hotel. She visits the hotel's website, where she enters her preferred check-in and check-out dates, specifies a deluxe sea-facing room, and indicates that two guests will be staying.

The system quickly presents her with a range of available room options that fit her preferences. She chooses the deluxe room and proceeds to the next step, where she enters her personal details, including her name, contact information, and a special request for early check-in.

After reviewing the total cost, which includes taxes and an early check-in fee, Sharmin confirms her booking and makes a secure payment through the hotel's integrated payment gateway. Upon successful completion, she receives a confirmation email with all the reservation details for her upcoming stay.

A few days later, Sharmin decides to change her check-in date. She logs back into the system, updates her booking, and promptly receives a revised confirmation with the adjusted details. The system accommodates her changes effortlessly, ensuring that she has the flexibility to manage her reservation up until her stay.

If Sharmin had needed to cancel, she could have done so easily, with the system updating her booking status and notifying her of any applicable refund policies. Throughout her journey, the hotel's reservation system ensures a seamless, user-friendly experience, handling every step from room selection to payment and modifications.

Write down the State Chart Diagram for the above scenario.

Task-2

```
<!DOCTYPE html>
<html>
<head>
<title>PictureViewing </title>
<!--
   This page shows image files that are located in a subfolder named "images". With
the Next button it is possible to see the next image.
-->

<style>
.centered
{
   text-align: center;
   margin:     16px auto;     /* top and bottom margins are set,
                                 right and left margins are automatic */
}
</style>

<script>
var  picture_file_names  = [ "images/1.jpg", "images/2.jpg", "images/3.jpg",
"images/4.jpg", "images/5.jpg" ] ;
var  picture_index = 0 ;

function show_next_picture()
{
   picture_index ++ ;

   if ( picture_index >= picture_file_names.length )
   {
      picture_index = 0 ;
   }

   var image_element = document.getElementById( "image_element_id" ) ;

   image_element.src = picture_file_names[ picture_index ] ;
}
</script>

</head>

<body>

   <div class=centered>
      <button onclick="show_next_picture()">Next</button>
   </div>

   <div class=centered>
      <img id=image_element_id
           src="images/1.jpg" width=800>
   </div>
</body>
</html>
```

Task-2

Exercise 1:

Add a new image to the list of pictures that is being displayed by the page.

Exercise 2:

Add a new button with text "Previous" to the page. By pressing this button it must be possible to view the previous image. You can add the new button into the same element where the Next button is defined. You'll need a new JavaScript function for the new button. The name of the new function could be show_previous_picture().

Exercise 3:

Add two new buttons with which it is possible to shrink or enlarge the shown picture. You need two new JavaScript functions for these buttons. The functions should modify the "width" attribute of the <img> element to change the picture sizes. (The height of the picture should adjust automatically when the width is changed.)