# Department of Computer Science & Engineering
## University of Asia Pacific (UAP)

Final Examination     Fall 2021     4th Year 2nd Semester

Course Code: BUS 401     Course Title: Business and Entrepreneurship     Credits: 3

Full Marks: 150                                                  Duration: 3 Hours

**Instructions:**
1. There are **Six (6)** Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins.

1. a. What are the differences between entrepreneurship and SME business? **[5]**

   b. Explain the term "Technopreneurship" and give some real-life examples of technopreneurship. **[10]**

   c. What are the natures of entrepreneurship? Explain in detail the implementing factors of it. **[10]**

### OR

   a. Why digital marketing is superior than traditional marketing and what are the different between digital marketing and traditional marketing? **[10]**

   b Describe the objectives of Digital marketing. **[5]**

   c. Explain the advantages and disadvantages of working in entrepreneurship. **[10]**

2. a Explain the terms "**Entrepreneurs**" and "**Entrepreneurship**"? How do you screen a new business opportunity? **[10]**

   b Why inbound marketing is important? Write the difference between inbound marketing and outbound marketing. **[10]**

   c. What are the types of digital marketing strategies? What can be the best strategy to boost your business? **[5]**

3. a. Why do we need SWOT analysis? Make a SWOT analysis of BFC food shop. **[10]**

   b. What is the importance of inbound funnel marketing model for branding a new product? Draw a funnel model with your opinion. **[15]**

4   a.   Write a short note on email marketing and Affiliate marketing strategies.    [5]

     b.   Explain different types of business cost.    [10]

     c.   Suppose your fixed cost for producing 100,000 products were 30,000 taka per year.  [10]
Your variable costs are 2.20-taka materials, 4.00-taka labor, and 0.80 taka overhead, for a total of 7.00 taka per unit. If you select a selling price of 12.00 taka for each product, then what will be your break-even point?

5.   a.   What is CVP analysis and Contribution margin?    [5]

     b.   Describe the benefit and drawbacks of SWOT analysis.    [10]

     c.   Carver Company produces a product which sells for $30. Variable manufacturing  [10]
costs are $15 per unit. Fixed manufacturing costs are $5 per unit based on the current level of activity, and fixed selling and administrative costs are $4 per unit. A sales commission of 10% of the selling price is paid on each unit sold. What is the contribution margin (CM) per unit?

6.   a.   For example, XYZ produces a spray paint. SP = $20; VC = $8; total FC = $10,000;  [5]
and sales, volume = 1,000. Sales people insist that reducing the selling price by $4 per unit increases sales volume by 20%. What is the impact on profit?

     b.   Why do we need break even (BE) analysis and explain the payback (PB) method for  [10]
accepting or rejecting any new business project?

     c.   What are financial statements? Discuss the discounted cash-flow method and the  [10]
categories of the balance sheet.

OR

     a.   What will be the effect, if payback period is less/greater than that required amount  [15]
by the owner?

     b.   What kind of methods are used for BE analysis? What is net cash flow? Describe  [10]
the types of it.

# Department of Computer Science & Engineering

## University of Asia Pacific (UAP)

### Program: B.Sc. in Computer Science and Engineering

| Final Examination | Fall 2021 | 4th Year 2nd Semester |
|---|---|---|

| Course Code: CSE425 | Course Title: Computer Graphics | Credits: 3 |
|---|---|---|

**Full Marks: 150**                                          **Duration: 3 Hours**

**Instructions:**
1. There are Six (6) Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins.
2. Non-programmable calculators are allowed.

1.  a) What is Affine Combination? How a line can be drawn using Affine Combination?  **5**

    b) How a parabola can be drawn using Affine Combination? Calculate the x and y coordinate of a point on the parabola at $t = 0.7$.  **5+5 =10**

    c) Do you know any algorithm that can split a Bezier curve in the middle into two Bezier curves? Calculate the coordinate of the middle point, $Q_m$ using that algorithm, where the coordinates of the control points are as follows:  **2+8 =10**

    P0 = (3, 5)
    P1 = (5, 14)
    P2 = (15, 17)
    P3 = (17, 8)
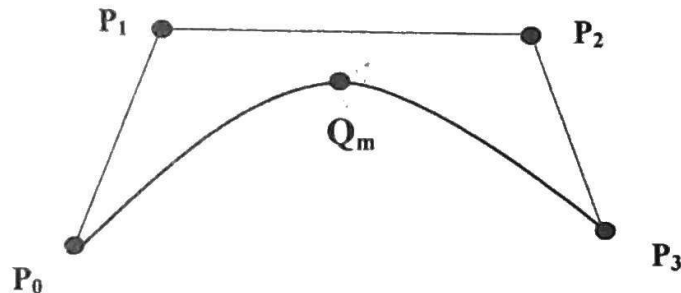


2.  a) What to Specify for modeling a 3D Shape? State three techniques to represent volume.  **5+5 = 10**

    b) Draw the 3D rendering pipeline along with the coordinate system used in different steps.  **10**

    c) Write down the names of the function in OpenGL to place the camera in the world coordinate and to obtain the perspective projection.  **5**

3.  A viewport is defined by $X_{min} = -4$, $X_{max} = 11$, $Y_{min} = 3$, $Y_{max} = 7$. Using Cohen Sutherland algorithm answer the following questions:  **5+ 10+ 10 = 25**

    I.   Calculate the region code of the endpoints R1 (0, - 2), R2 (-2, 5), R3 (5, 2).

    II.  Classify each line (R1R2, R2R3, R3R1) if they are inside or outside or intersecting the viewport.

    III. Find the coordinates (x and y) of intersection points.

4. a) How would you transform a RGB colored pixel into CMY color model? Draw the color space of the HSI color model.   5+5 =10

b) The following objects and the Z-values of their pixels are given. Now using Z-Buffer algorithm determine the final Z-buffer matrix.   10

| Object - 1 | | | |
| --- | --- | --- | --- |
| 1 | -2 | 1 | 2 |
| 5 | 4 | -2 | -1 |
| 3 | 4 | 1 | 3 |
| 2 | 1 | 1 | 1 |

| Object - 2 | | | |
| --- | --- | --- | --- |
| -5 | -7 | 5 | 3 |
| 2 | 3 | 1 | 4 |
| 2 | 4 | -1 | -3 |
| -2 | -1 | 3 | 1 |

| Object - 3 | | | |
| --- | --- | --- | --- |
| -3 | -2 | -1 | 4 |
| 2 | -1 | 4 | 2 |
| 5 | 6 | 4 | 5 |
| 3 | 2 | 5 | 6 |

c) What is the purpose of Painter's algorithm? State some disadvantages of this algorithm.   5

5.

a) Consider a triangle with vertices P1 (10, 5, -5), P2(20, 7, -2), P3 (15, 10, -10) in 3D space. Find the new coordinates of the Triangle after the following operations   5+10 =15
   I) Translate the triangle with dx=2.8, dy=4.5, and dz=3.75
   II) Rotate the triangle 60° about Z-axis.

b) What are the Baricentric Coordinates? Why we need Baricentric Coordinates? State the properties of Baricentric Coordinates.   2+4+4 =10

OR

a) Rotate the triangle ABC where the coordinates of the vertices are A(3, 3), B(5,4) and C(4, 5) with θ = 45° about a point P(-2, 1). Find the matrices needed for the operation and the new Coordinates of the triangle after the operation.   15

b) Define the following types of Animation: Key Framing, Procedural, and Physically based animation.   10

6.

a) Write the equation to calculate the $I_{Phong}$. Calculate the amount of directed (specular) reflection if the angle between reflected light ray and viewing vector, φ = 10o and surface property parameter, e = 5.   5+10 =15

b) Describe the advantages and disadvantages of Flat Shading, Gouraud Shading, and Phong Shading.   10

OR

a) Coordinate of a circle center is (0, 0), the radius, r = 13, and first pixel (0, r) is given.   10+5 =15
   a) Determine the location of the next five pixels using Bresenham's Midpoint algorithm.
   b) Calculate the other points, found by symmetry with respect to the last (5th) pixel locations calculated from the above question.

b) What is Texture Mapping? Write the basic algorithm for texture mapping. What is Mip Mapping?   10

**Instructions:**
1. There are **Six (6)** Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins.
2. Non-programmable calculators are allowed.

1.    Consider the below stated Context-Free Grammar (CFG):    [10
      P → Qa | bQc | Rc | bRa    +
      Q → x    5
      R → z    +
   i.    Construct the LR (1) item sets.    5
   ii.    Apply the CLR (1) algorithm and find out the parsing table for the above-stated    +
        grammar.    5
   iii.    Apply the LALR (1) algorithm and find out the parsing table for the above-stated    =
        grammar.    25]
   iv.    Examine the parsing tables of CLR (1) and LALR (1) and find out if the above-
        sated grammar is CLR (1) or LALR (1).

**OR**

   Consider the below stated Context-Free Grammar (CFG):    [10
      S → L = R | R    +
      L → *R | id    5
      R → L    +
   i.    Construct the LR (1) item sets.    5
   ii.    Apply the CLR (1) algorithm and find out the parsing table for the above-stated    +
        grammar.    5
   iii.    Apply the LALR (1) algorithm and find out the parsing table for the above-stated    =
        grammar.    25]
   iv.    Examine the parsing tables of CLR (1) and LALR (1) and find out if the above-
        sated grammar is CLR (1) or LALR (1).

2.    Consider the below stated Context-Free Grammar (CFG):    [10
      S → AaAb | BbBa    +
      A → ε    5
      B → ε    +
   i.    Construct the LR (0) item sets.    5
   ii.    Apply the LR (0) algorithm and find out the parsing table for the above-stated    +
        grammar.    5

iii. Apply the SLR (1) algorithm and find out the parsing table for the above-stated grammar.

iv. Examine the parsing tables of LR (0) and SLR (1) and find out if the above-sated grammar is LR (0) or SLR (1). Give reasons behind your choice.

**= 25]**

## OR

Consider the below stated Context-Free Grammar (CFG) for Boolean Expression:

bexpr → bexpr **or** bterm | bterm

bterm→ bterm **and** bfactor | bfactor

bfactor → **not** bfactor | ( bexpr ) | **true** | **false**

i. Construct the LR (0) sets of items.

ii. Construct the SLR parsing table, if one exists.

iii. Identify if there is any action conflicts in your sets of items.

Note: In this grammar, there are only 3 non terminals i.e. **"bexpr"**, **"bterm"**, **"bfactor"**; the rests are all terminals.

**[10 + 10 + 5 = 25]**

**[10]**

3. Consider the below stated Context-Free Grammar (CFG):

$Q \rightarrow QED \mid q$

$E \rightarrow e$

$D \rightarrow NFA \mid d$

$N \rightarrow DFA \mid DFADFA \mid n$

$F \rightarrow f$

$A \rightarrow a \mid \varepsilon$

i. Identify first and follow function for the above-stated grammar.

ii. Construct the LL (1) parsing table for the above-stated grammar.

iii. Can you give an example of a string that can be successfully parsed by the above-stated grammar? Explain the intermediate procedure in details.

**[15 + 5 + 5 = 25]**

4. Consider the following statement of a code:

$$((a+b)* -x + (2/(a+b))) - (a+b)* -x$$

i. Build the Abstract Syntax Tree (AST) and Directed Acyclic Graph (DAG) for the above expression.

ii. Construct a Three Address Code (TAC) for the same expression stated above.

iii. Build the Quadruples and triples from the TAC that you will get in 4(ii).

**[10 + 5 + 10 = 25]**

5. a. i. Identify the leaders in the TAC that you calculated in 4(ii). Also, specify the reasons for choosing a leader.

ii. Analyze the TAC statements you got from 4(ii) to find out the basic blocks by using the leaders.

iii. Construct the flow graph for your code based basic blocks.

**[5 + 5 + 5 = 15]**

b. Explain how does the left factoring and left recursion affect while calculating the LR parsers? [10]

6. a. What are the differences between Machine Dependent Code Optimization and Machine Independent Code Optimization? [10]

   b. Explain the techniques of Machine Independent Code Optimization with examples. [15]

# Department of Computer Science & Engineering

## University of Asia Pacific (UAP)

### Program: B.Sc. in Computer Science and Engineering

**Final Examination**        **Fall 2021**        **4$^{TH}$ Year 2$^{ND}$ Semester**

**Course Code: CSE 457**      **Course Title: Design and Testing of VLSI Circuit**      **Credits: 3**

**Full Marks: 150**                             **Duration: 3 Hours**
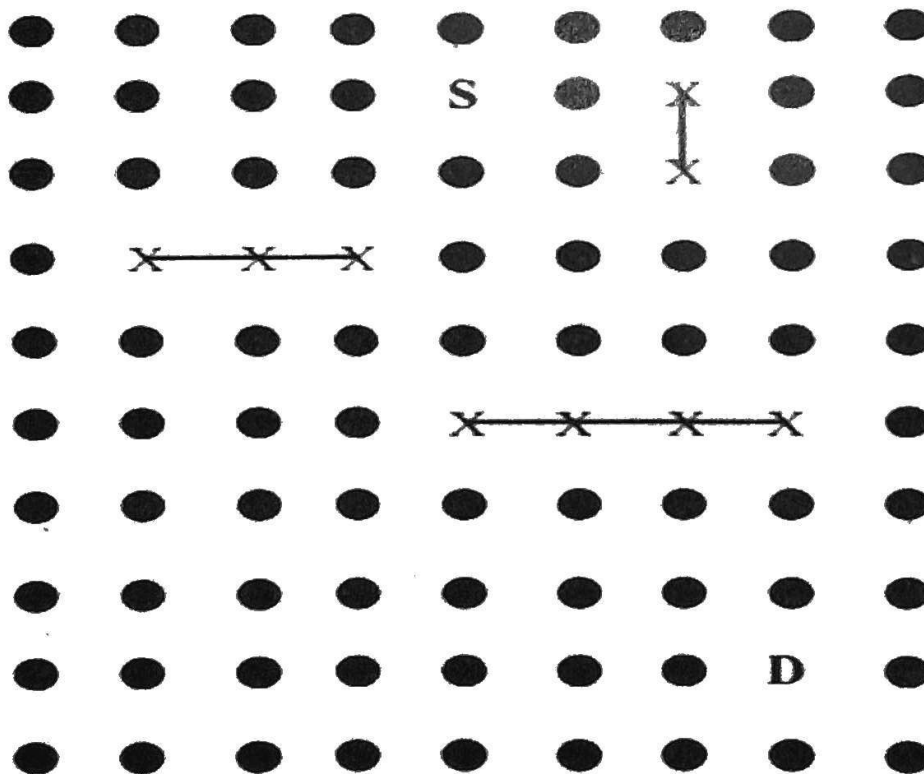
**Instructions:**
1. There are **Six (6)** Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins.
2. Non-programmable calculators are allowed.

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1. **a)** Explain VLSI Circuit testing with a relevant diagram.     **10**
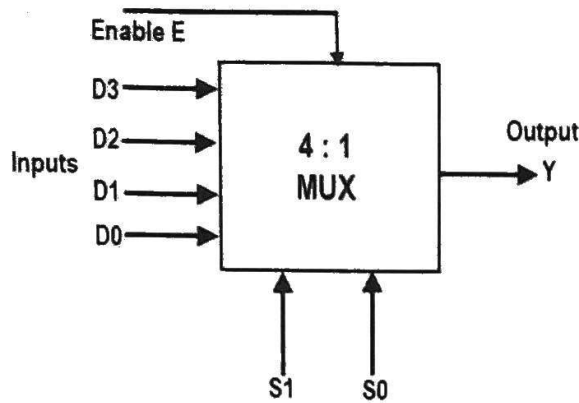
   **b)** Solve the following using lee's algorithm. Prepare a route from S to D. Details of each step should be explained.     **15**

**2.** Consider the following circuit



**a)** Prepare the truth table of the circuit.                                          **10**

**b)** Design the CMOS equivalent circuit of this multiplexer.                          **15**
You don't need any explanation. Only CMOS design is sufficient.

**3.**     Consider a D latch.
**a)** Prepare a D latch circuit using logic gates.                                     **10**
You can use AND, OR, NOT etc. gates for this circuit.

**b)** Discuss the steps to produce a CMOS Equivalent circuit of this D latch from 3a.  **15**

Produce a CMOS design of D latch from that discussion.

**4.** **a)** Briefly discuss combinational and sequential circuit testing in VLSI.     **10**

**b)** Determine the position of the Fermi level w.r.t. the Valence band energy in p-type silcon   **15**
at T=300k.
Given that $n_a = 5*10^{15}$ electrons/cm^3 and $n_d = 4*10^{15}$ electrons/cm^3.

<div align="center">OR</div>

**a)** Let us consider a product with the following components:                         **10**
Microprocessor — 10 FIT
10 RAM chips — 10 FIT each
100 TTL parts — 10 FIT each
What is the total failure rate of the product?

**b)** Find out the slicing floorplan and alternative slicing floorplan for the following circuit.   **15**
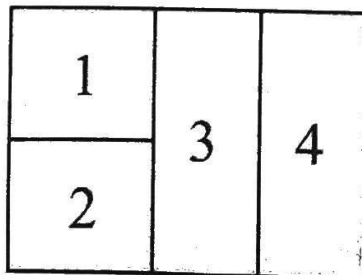


**5.** **a)** With the help of a diagram, explain bathtub curve of IC reliability.      **10**

**b)** The following circuit is partitioned into six major blocks. Each block is represented by a   **15**
rectangle which has a fixed amount of area requirement.
Design floor planning and partitioning. Briefly explain how you complete this design.
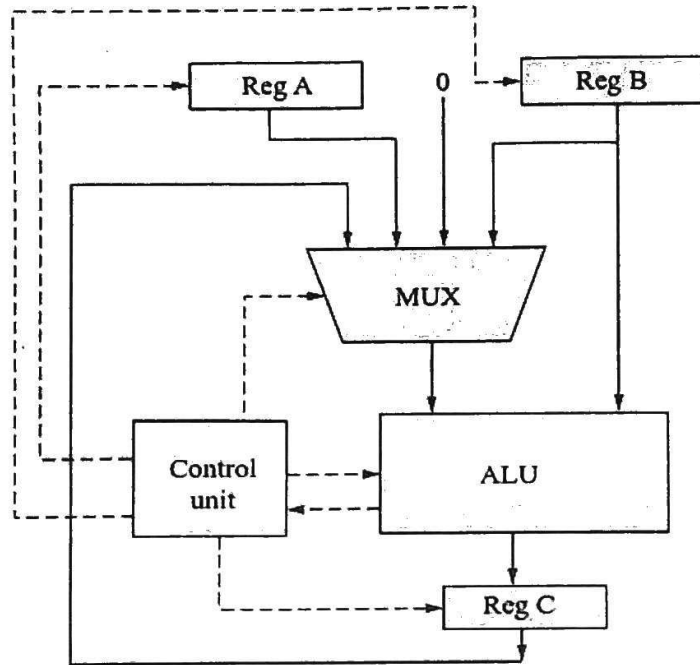


6. **a)** What is Signal strength? Explain signal strength for NMOS and PMOS using diagram.   **10**

   **b)** What is transmission gate? Explain transmission gate with diagram and show input and   **15**
   output values.

<center>OR</center>

   **a)** What is pass transistor? Explain pass transistor with a diagram and show input and   **10**
   output values.

   **b)** What is tristate? Explain tristate gate with proper diagram and truth table.   **15**

| Energy Band Formulas | |
|---|---|
| $n_o = n_c \, e^{\frac{-(E_c - E_f)}{KT}}$ | $P_i = n_v \, e^{\frac{-(E_i - E_v)}{KT}}$ |
| $P_o = n_v \, e^{\frac{-(E_f - E_v)}{KT}}$ | $n_o = n_i \, e^{\frac{(E_f - E_i)}{KT}}$ |
| $n_i = n_c \, e^{\frac{-(E_c - E_i)}{KT}}$ | $P_o = n_i \, e^{\frac{(E_i - E_f)}{KT}}$ |