Department of Computer Science & Engineering

University of Asia Pacific (UAP)

Program: B.Sc. in Computer Science and Engineering

Final Examination **Spring 2020** **4TH YEAR 2ND Semester**

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

Full Marks: 120* (Written) **Duration: 2 Hours**

* Total Marks of Final Examination: 150 (Written: 120 + Viva: 30)

Instructions:

1. There are **Four (4)** 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)** Determine which of the following is better 20

a) Tristate
b) MUX

Hint: Draw circuits and show input output relations in a table

b) Why is an FPGA popular from an engineering design point of view? 10

OR

a) A circuit with six components is given (MUX, CU, Reg A, Reg B, Reg C, Memory). Determine the Partitioning step and the floor-planning steps. Include relevant diagrams and a brief description of which will be your first and which will be your second step here. 20

b) Why should we choose lee's algorithm for Routing? Discuss from a designer's point of view. 10

2. **a)** Design a conventional Transmission Gate. Include relevant diagrams and working procedures. 20
Hint: Draw all four types. Show input and output relations in a table.

b) As you know, a ring oscillator is constructed from an odd number of inverters. Estimate the frequency of a 31-stage ring oscillator. Consider, Last three digit of your Registration number as the delay in Picosecond. 10
For example, if your Registration number is 16201021, let delay be 021 Picosecond.

3. **a)** How to design your circuit so that no latch up occurs in your circuit in the event of an ESD? 10

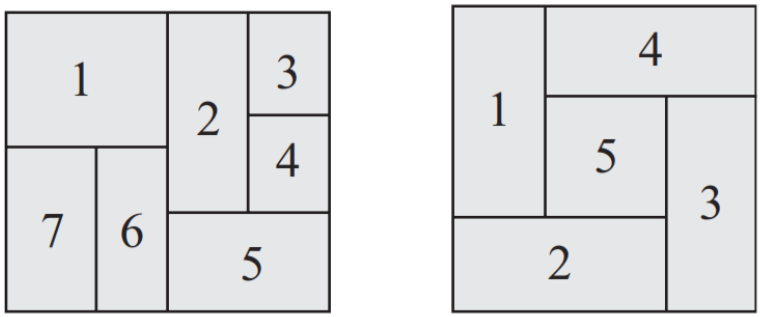
b) Determine three key regions of a bathtub curve in reliability testing. Briefly state the reason behind the reason's identification name. 10

c) Consider a wafer with 10

- Defect density d = 1.25 defects/cm2
- clustering parameter α = 0.5 and Chip area, A = 8 mm × 8 mm = 0.64 cm2
- each wafer has 500 chips
- The cost of processing a wafer is $100

Determine the processing cost of per chip.

4. **a)** Consider the following 20



(a) (b)

I. What do the diagrams refer to?

II. Find out the Slicing Tree of (a) and Alternative Slicing Tree of (a).

b) Show that an N-input NAND gate will follow a certain formula as far as logical effort is concerned. 10

Hint: 2 different NAND gate will be enough.

University of Asia Pacific
Department of Computer Science and Engineering
Final Examination, Spring-20
Program: BSc

Course Title: Business and Entrepreneurship Course Code: BUS 401 Credit: 3
Time: 2 hours Full Marks: 40
(Answer all the questions. Each question carries equal marks.)

Qs 1. Suppose you have developed a new idea during the 4 months lockdown period in Bangladesh. The idea can be anything that helps people to combat the challenges that are thrown by Covid-19 (i.e. Economic/ Business/Health/ Education/Entertainment/any other field).

a. Develop a detailed marketing program (4P or 7P) of your idea. 10
b. Who are going to be your consumers? Discuss through segmentation, targeting and positioning analysis. 10

Qs 2. (a) Now develop a detailed SWOT analysis on the idea that you have developed in question number 1. 10

(b) In order to position your product in the minds of your customers develop a brand and discuss how you are going to differentiate your product from your competitors' in order to position the brand in the consumer's minds. 10

Department of Computer Science & Engineering

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Program: B.Sc. in Computer Science and Engineering

Final Examination **Spring 2020** **4th Year 2nd Semester**

Course Code: CSE 429 **Course Title: Compiler Design** **Credits: 3.00**

Full Marks: 120* (Written) **Duration: 2 Hours**

* Total Marks of Final Examination: 150 (Written: 120 + Viva: 30)

Instructions:

1. There are **Four (4)** 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)** Draw the AST of the following equation: (5*3)=15

a:= (b + c) + d * (-e) * (b + c)

(1st draw it considering it as left associative and then draw it as right associative)

Now draw the DAG of the same equation considering as right associative only.

b) Now, Convert the question of 1(a) DAG to a three address code. 15

Draw the Quads and Triples of the three address code. Also write 1 advantage and 1 disadvantage of Quads and Triples.

2. **a)** What is live and dead variable? Why those are required in compiler designing? 15

Apply the Next Use algorithm on the following code snippet to find out live variables.

(Consider all t variables as temporary ones)

t1:= a + b + c

t2:= t1 –b –c

a:= t1 + t2

t3:= t1 – t2

b) Draw flow diagram with basic blocks from the code below and also find out the set of SCC (Strongly connected component) and entry point. 15

```
L1: cmp ax, bx
    jge L1
L2: add ax, bx
L3: mul cx
L4: cmp cx, bx
    Jle L2
   Sub cx, bx
   jmp L4
```

3. **a)** 15

L → E

E → E + E

E → E – E

E → E * E
E → E / E
E → A
A → A digit
A → digit

For the given grammar, add semantic rules/actions. Also draw the SDT of the given input. 2 * 50 / 5.

Also, explain what is SDT and why is it used?

b) Write whether the following are S-attributed / L attributed / both and why? 10

(i) S → A B C D {A.val = S.val, A.val = B.val}

(ii) P → A + D {P.val = A.val + D.val, P.type = A.type}

(iii) D → T unit1 , unit {T.type = D.type, unit1.val = unit.val }

(iv) A → B C D {A.val = B.val, B.val = C.val, D.val= C.val}

(v) A → E F G H {H.val = G.val, G.val = F.val, F.val = E.val, A.val = E.val, E.type = A.type}

c) Why evaluation order is required? In how many ways can we do evaluation? (Names only) 05

4. **a)** Parse using the operator precedence parser: (Left associative grammar) 15

E → EAE | minus E | id

A → X | / | + | -

[Here, this **minus** is a terminal and unary operator whereas – is an operator used between two variables. So, **minus** has a highest precedence than any other operator]

Input: **minus id X id + id / minus id**

b) Draw the graph representing precedence function of 4(a) 10

c) When a grammar can be called as Operator grammar? 05

OR

a) Write down the difference between LR and LL. 10

b) Find whether the following grammar is LL(1) or not. If there is any ambiguity in the grammar, then remove them and check. 15

i) S → X d
X → C
X → B a
C → ϵ
B → d

ii) S → iCtSX | a
X → eS | ϵ
C→ b

iii) A → A X | Y
X → b | c
Y → d | e

c) What do you mean by shift step and reduce step? 05

Final Exam
Compiler Design
CSE 430

Time: 1 hr 15 min **Upload time: 10 min**

1. Variable: expression ADDOP expression_statement 02

   Write down the $ values of all the terminals and non-terminals here.

Variable	
expression	
ADDOP	
expression_statement	

2. What will be the data type after following operations? 05

integer + float	
integer * float	
float % float	
float > = float	
float && integer	

3. How to handle conflict in yacc file? (you may give of the if else conflict handled in your y file) 01

4. What function will be called if there is an error in the yacc file? Do not need to write the exact function name, give the idea. 02

5. What are the attributes added in the symbolInfo file for doing the semantic analysis phase? (Just give examples, no need to write codes. If you forget the exact names, just give the idea) 02

6. Which data types are handled in our simple compiler for C language? (data type means short, int, float, long, double, float etc) 01

7. Can you write how the yacc file access the symbolInfo object of lex file? / In which type the symbolInfo is casted to make it use by yacc file? 02

8. What do you mean by shift/reduce conflict? 01

9. How many sections are there for writing a lex file? And what are they? 02

10. Write the regular expression: (the way you did in your assignment) 05
    a. Multiple line comment
    b. Identifier
    c. Error with multiple decimal points (12.34.45.67)
    d. Error of unrecognized character
    e. CONST_INT

11. Can you write the significance of using flex tool? (why do we use it) 02

12. Suppose, you want to design a compiler for a new language. Can you draw the pipeline or steps to complete your design? 03

13. Why CONST_INT/ CONST_CHAR tokens are used instead of using INT/CHAR for integers (1, 12, 344 …)/ characters (‘a’, ‘b’, ‘e’ …) 02

14. Is symbol table a part of compiler? What is the significance of using this table? 02

15. Which functions have you implemented/used in the implementation of a symbol table for your compiler? Can you write their use? Example: print () function for printing the whole symbol table. 01

16. Suppose, you have a symbol table of size 4 and you have used the same hash key generation like lab (using ascii values), can you draw the table structure after inserting: (showing the position and index of the elements in the symbol table) 04

Name	Type	Ascii values
785	Number	7: 55, 8: 56, 5: 53
587	Number	7: 55, 8: 56, 5: 53
Lab	Identifier	L: 76, a: 97, b: 98
for	Keyword	f: 102, o: 111, r: 114

17. Can you draw the structure after deletion of 587 from the symbol table of question 16? 02

18.	What new attribute has to be added in the symbol info for the code generation phase in compiler design? (If you forget the exact name, just give the idea)	01
19.	What is the need of newTemp function in the code generation? What does it do? (No need to write the code, just give the idea)	02
20.	Can you give 2 examples where code optimization is required?	02