**MID TERM**

## CSE - 315 Microprocessor

**Chapter 1**

1st class

* Microprocessor = A processor is the logic circuitry that responds to and processes the basic instructions
* Moor’s Law = the number of transistors in a dense integrated circuit doubles approximately every two years.
* Terms (kbps, byte, megabyte) \*\*\*
* 8080 microprocessor (AL, BL, CL, AH, BH, CH, 8-bit and 16-bit register)
* **~~Moore’s law \*\*\*~~** ~~(2 years transistor will be double) + Graph~~
* **~~3 main tasks of microprocessor~~**
* **Von neument model** \*\*\*
* **~~Buses \*\*\* (CT~~**

2nd class

* ~~Basic architecture~~
* ~~Cache memory~~
* ~~PCI~~
* **~~Computer Structure (Diagram)~~** ~~\*\*\*\*\*~~
* ~~Intel microprocessor buses (2^n = max address bus)~~
* ~~Reading from memory~~
* ~~Basic bus architecture = USB, PCI~~
* **~~Bank layout = 8bit, 16bit, 32bit, 64bit (diagram draw)~~**
* ~~8 bit data formate (DB, DW, DD)~~

**Chapter-2**

3rd class

* ~~Microprocessor architecture~~
* Microprocessor= logical & physical design
* ~~MP performs 3 functions.~~
* **~~MP 8086 = BIU, EU~~** [~~link bangla~~](https://www.youtube.com/watch?v=-1DNUv8rRgw&ab_channel=MurshedulArifeen) ~~\*\*\*\*\*~~
* **General purpose Register** = used for arithmetic logic
* Stack Register = Base pointer, Stack pointer
* Queue

Class

* **9 Flag bit**
* **~~Effective Address Calculations~~** ~~\*\*\*~~
* Segmentation: Pros and Cons \*\*\*
* **Selectors and Descriptors**
* **Real mode vs Protected mode**

**Chapter 3**

5th class

* Addressing Model = used for data movement
* Register addressing, Immediate Addressing, Direct addressing, Register Indirect, Base Plus index

**Microprocessor Overview**

* **What is Microprocessor** = A processor is the logic circuitry that responds to and processes the basic instructions
* **Moor’s Law** = the number of transistors in a dense integrated circuit doubles approximately every two years. Draw Graph
* **~~3 Main task~~** ~~of microprocessor~~
* **Von neument design + model (Draw)\*\*\***
* ~~\*\*\* Types of Buses = Data, Address, Control.~~
* **What is Bus?** A common group of wires that interconnect components in a computer system.
* **\*\*\* Buses Architecture** (**Draw)\*\*\***
* **Reading from Memory**  (Draw)\*\*
* **\*\*\* Bank Layout**  **Draw\*\*\***
* **3 Functions** perform by microprocessor
* 8086 microprocessor **Architecture functions** = BIU, EU
* **BIU, EU** Explain
* ~~Calculate Addressable~~ **~~Memory size 2^n~~**
* **~~\*\*\* General, Special~~**~~, Purpose Register~~
* ~~Stack~~
* ~~Queue~~
* ~~What is Pipelining = Fetch the next instruction while the current instruction executed is called pipelining.~~
* IP (instruction pointer) > CS and IP register
* **~~Flags~~** ~~(~~**~~6 Conditional + 3 Control~~**~~)~~
* Segment register
* **Real-mode** Memory Addressing
* Segment offset register
* Segmentation: Pros and Cons
* Limitations of the above real mode segmentation scheme
* Protected Mode Segmentation
* Selector & Descriptor
* [Data Mode](https://www.youtube.com/watch?v=QP-4FlwNTvw&ab_channel=Education4u)
* 11 Practice

**Real mode** is characterized by a 20-bit segmented memory address space (giving 1 MB of addressable memory) and unlimited direct software access to all addressable memory, I/O addresses, and peripheral hardware. Real mode provides no support for memory protection, multitasking, or code privilege levels.

**Protected mode** is a mode of program operation in a computer with an Intel-based microprocessor in which the program is restricted to addressing a specific contiguous area of 640 kilobytes. Intel's original PC microprocessor, the 8088, provided one megabyte (1 Mbyte) random access memory (RAM).

**Real Vs Protected Mode?**

Real mode memory exists at locations 00000H-FFFFFH the first 1M byte of the memory system—and is present on all versions of the microprocessor. Protected mode memory exists at any location in the entire memory system, but is available only to the 80286—Pentium II, not to the earlier 8086 or 8088 microprocessors.

**Segmentation** is the process in which the main memory of the computer is logically divided into different segments and each segment has its own base address.

Complete

## CSE -319 Compiler

**Learning Source: Anisul Islam |**

**1st class**

* ~~6 phases of a compiler~~
* ~~The language processing system 5 phases~~
* ~~Symbol, alphabet, string, language~~

2nd class

* **Lexical**, token, [link](https://www.youtube.com/watch?v=e20DMGuLg6k&list=PLgH5QX0i9K3oWTwTgILA7v9oysoDgkJDg&index=5&t=505s&ab_channel=AnisulIslam)
* Lexical 3 terms = lexeme, pattern, token
* ~~theory of computation, finite automata.~~
* ~~DFA (problem solve 2)~~

3rd class

* DFA (problem solve 7)

4th class

* DFA (problem 5)
* ~~NFA to DFA conversion (problem 2)~~

5th class

* ~~Nfa with epsilonot~~
* NFA to DFA (small problem 9)

There will be a class.

* Symbol table

6th class

* **Context-free Grammer** (Syntex analysis) [link](https://www.youtube.com/watch?v=wIsPGUcTqXY&list=PLgH5QX0i9K3oWTwTgILA7v9oysoDgkJDg&index=13&t=9s&ab_channel=AnisulIslam)
* Context-free grammar = DFA, CFG, RE, Parse Tree (4 problems solved)

7th class

* Top-down, bottom-up
* **LL(1) parser 3 condition**
* Recursion
* Common Prefix grammar
* Ambiguous [link](https://www.youtube.com/watch?v=8MwWl85NAe8&ab_channel=AbhishekSharma) [banglaLink](https://www.youtube.com/watch?v=y4ZZYqWJ9po&ab_channel=Lecturelia)
* Ambiguity = Associativity, Precedence

8th class

* **Left recursion remove** [link](https://www.youtube.com/watch?v=EyghgFahrk4&list=PLgH5QX0i9K3oWTwTgILA7v9oysoDgkJDg&index=16&t=12s&ab_channel=AnisulIslam)
* **Indirect left recursion**
* **Eliminating left recursion** (Algorithm)
* **Left factoring** [Link](https://www.youtube.com/watch?v=qy9fixRKZeM&list=PLgH5QX0i9K3oWTwTgILA7v9oysoDgkJDg&index=20&ab_channel=AnisulIslam)
* 10 Practice problem

Complete

## HUM -201 **Economics**

1st class

* ~~What is economics~~
* ~~Micro and macroeconomics~~
* ~~3 types of economic systems (capitalism, communism, socialism)~~
* ~~4 economic problems (unlimited demand, limited resource, use resource, choice)~~

2nd class

* **~~Demand and supply~~**
* Government supply
* Opportunity cost
* ~~3 types of Economic systems (free, planned, mixed)~~

3rd class

* ~~Function, Model~~
* Independent and dependent variable
* Mathematical model
* 2 types of model = simple regression, and multiple regression.
* Alpha, beta

4th class

* Math 2 (alpha, beta, demand model)

5th class

* Math 2 (1st is alpha, beta, demand model, and 2nd is multiple regression)

6th class

### **Economics Topic:**

* **\*\*\* What is economics?** the branch of knowledge concerned with the **production, consumption, and transfer** of wealth.
* \*\*\* Micro and Macro Economics
* ~~Types of~~ **~~economic systems~~** ~~= communism, capitalism, and socialism.~~
* ~~What are~~ **~~needs~~** ~~and~~ **~~wants~~**~~?~~
* **~~4 economics problem~~** ~~=~~ ***~~unlimited demand, limited resource, resource use, choices~~***~~.~~
* ~~Economics has two things => Demand & Supply~~
* ~~Government supply = revenue budget (1 year), capital budget (5 years)~~
* **\*\*\* Opportunity cost** = the **loss of other alternatives** when one alternative is chosen. Or/ **Choosing one alternative over another**.
* **\*\*\* What is Function?** A function is the **mathematical expression** of the **relationship between two values.**
* **\*\*\* Mathematical Model / Regression Model?** The model shows the **relationship between the dependent and independent variables**.
* **~~\*\*\* 2 types of regression models~~** ~~= Simple regression model, and multiple regression model.~~
* What is beta & alpha? Rate of change

alpha = no change in price (x)

beta = price (x) increases by 1 taka.

* **What is Utilities?** a term used to **measurement of the worth or value** of a **good or service**.
* ~~2 types of utilities = Cardinal (measure numerical), ordinal (can’t numerical)~~
* ~~\*\*\*~~ **~~3 kinds of utilities~~** ~~= Marginal (Single unit values), Total, and Average.~~
* dIffled of marginal utilities 5 rules
* \*\*\* **Marginal and Total relationship** (4 Rules) (draw graph)
* Theory of Demand and Supply
* **What is Demand?**  the **consumer's desire to buy a product or service**.
* **What is Supply?** the **total amount of a specific good or service** that is **available to consumers**.
* ~~3 Types of~~ **~~Decision making units~~** ~~= firm, entrepreneur, household~~
* **~~Circular flow of economic activity~~** ~~= input market, output market~~
* What is the input market & output market?
* **Input market** = labor, capital, land
* ~~Determinants 5 of household Demand~~
* Demand in the Output market = Demand curve, the law of demand,
* ~~Determinants of 5 Supply~~

Word = decline,

## CSE 411 SOFTWARE ENGINEERING

**70% Complete**

Chapter 1

* SDLC

Chapter 2

* Agile model \*\*\*
* Spiral model \*\*\*

Chapter 3

* Sequence Diagram
* Class diagram \*\*

Chapter 4

* Cocomo model, types
* Math cocomo

**Software Engineering:**

Chapter 1

* What is **Software Engineering**? The **software** is a collection of integrated programs.
* Software Engineering Requirement
* SE appare
* Characteristics of SE
* Software Process
* **Software components** = Program + Document + OS
* Documentation (Diagram)
* Operating System (Diagram)
* 6 stages of the software development life cycle + Explain

**Chapter 2 - Requirement Engineering**

* **What is RE?** refers to the process of defining, documenting, and maintaining requirements
* Four steps of the process for RE
* **SDLC Models** = Waterfall model, Spiral Model, Agile Model (SCRUM)
* SCRUM Testing methods (Draw/Explain)

Chapter 3

CSE-320 COMPILER DESIGN LAB (1.5)

CSE - 316 Microprocessor & Assembly Language Laboratory (1.5)

**CSE 227 Project -1 (Web database / Object Oriented Programming ) (1.5)**

**DLD**

In computing, a compiler is a computer program that translates computer code written in one programming language into another language.

## **Own Study:**

**DFA (Compiler)**

1. Start with a
2. Start with ‘aa’
3. Start with ‘aab’
4. Start with ‘10’
5. Contains ‘a’
6. Contains ‘ab’
7. [Contains ‘001’ as a substring](https://www.youtube.com/watch?v=-S0rMDQqxGs&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=13&ab_channel=AnisulIslam)
8. [Contains the substring ‘baba’](https://www.youtube.com/watch?v=exFOaRqW5Ps&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=14&ab_channel=AnisulIslam)
9. [Ends with an ‘a](https://www.youtube.com/watch?v=qbwYuH2GcOg&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=16&ab_channel=AnisulIslam)’
10. [Each string ends with ‘ab’](https://www.youtube.com/watch?v=wfoDl8irxSg&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=16&ab_channel=AnisulIslam)
11. [staring and ending with different symbol](https://www.youtube.com/watch?v=kZB2rMGvQHY&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=17&ab_channel=AnisulIslam)
12. [staring and ending with same symbol](https://www.youtube.com/watch?v=J_URe9dZlz8&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=18&ab_channel=AnisulIslam)
13. every 'a' is followed by 'b' <https://www.youtube.com/watch?v=2-N4bIhhS5U&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=19&ab_channel=AnisulIslam>
14. E[very 'a' is never be followed by 'b'](https://www.youtube.com/watch?v=KiKtpGLnOyE&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=20&ab_channel=AnisulIslam)
15. E[very 'a' is followed by 'ab'](https://www.youtube.com/watch?v=5oA5wWS2QGU&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=21&ab_channel=AnisulIslam)
16. every 'a' is never be followed by 'ab'
17. every '0' is followed by at least one '1'
18. DFA of string length exactly 2
19. DFA of string length at least 2
20. DFA of string length at most 2

Intro to minimal DFA

1. Divisible by 2
2. Not divisible by 2
3. [Divisible & not divisilble by 3](https://www.youtube.com/watch?v=jWx1LGIdMsE&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=31&ab_channel=AnisulIslam)
4. Divisible & not divisible by 4
5. Exactly, aleast, utmost 2 ‘a’
6. Even odd number ‘a’
7. Number of a is divisible and not divisible by 2

Dfa construction <https://www.youtube.com/watch?v=EA_q2YoCN9c&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=37&t=102s&ab_channel=AnisulIslam>

1. [2nd,3rd,4th symbol from LHS is ‘a](https://www.youtube.com/watch?v=OA19JClIh6Y&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=41&ab_channel=AnisulIslam)
2. [Binary number is divisible by 2](https://www.youtube.com/watch?v=ENZVxUuAEQI&list=PLgH5QX0i9K3qw5pu16QgnKNj91Rnjoyd0&index=42&ab_channel=AnisulIslam)

# **Final Term**

**Compiler Design**

**Learning Source:** [**Gate Smasher**](https://youtube.com/playlist?list=PLxCzCOWd7aiEKtKSIHYusizkESC42diyc) **|**

**1st Class**

* ~~parsing~~
* ~~First and follow (problem 3)~~

**2nd class**

* ~~First and follow, stack, parsing tree~~
* ~~LL(1) parsing table~~ [~~Link~~](https://www.youtube.com/watch?v=WTxdKQmsfho&list=PLxCzCOWd7aiEKtKSIHYusizkESC42diyc&index=9&t=133s&ab_channel=GateSmashers)
* **~~Practice 2~~**

**3rd class**

* ~~LL(1)~~
* LR(0) [Link](https://www.youtube.com/watch?v=J4ZME5KOB-s&list=PLxCzCOWd7aiEKtKSIHYusizkESC42diyc&index=12&ab_channel=GateSmashers)
* ~~SLR(1)~~ [~~Link~~](https://www.youtube.com/watch?v=Z1Hu9TIef9k&list=PLxCzCOWd7aiEKtKSIHYusizkESC42diyc&index=13&ab_channel=GateSmashers)
* LR(0) stack
* **~~2 problem(conflict)~~** ~~LR and SLR (shift/reduce, reduce/reduce)~~

**4th class**

* ~~LR(0) and SLR(1)~~ **~~[Problem solved 6]~~**

**5th class (online)**

**6th class**

* ~~CLR(1) and LAL(1)~~ **~~[problem solved 2]~~**

**7th class**

* 3 problem solve

**8th class**

***Semantic Analysis 6 mark***

* Annotated parse tree
* Annotated parse tree represent by 4
* ~~Annotated parse tree = SDD, SDT~~
* ~~6 Types of semantic Analysis error~~
* S-attribute, L-attribute
* CFG to **Annotated parse tree**, (**Problem solved 2**)
* syntax tree

**9th class**

* Inherited (18 page in slide)
* Intermediate code generation
* Syntex tree
* **DAG**

**Topics:**

* **Left recursion**
* **Left factor**
* **~~LL(1) first and follow,~~** ~~parsing table, stack, parsing tree~~  **~~{7marks}~~**
* **~~LR(0)~~**~~,~~ **~~{7marks}~~**
* **~~SLR(1)~~**
* **~~CLR(1)~~** [~~link~~](https://www.youtube.com/watch?v=sMxqUQc_jHQ&ab_channel=GateSmashers)**~~{7marks}~~**
* **~~LALR(1~~**~~)~~ [~~link~~](https://www.youtube.com/watch?v=GOlsYofJjyQ&ab_channel=GateSmashers)
* **~~Annotated parse tree =~~** ~~SDD Vs SDT~~
* **~~6 Types of semantic Analysis error~~**
* **S-attribute, L-attribute**
* **Annotated parse tree Draw**
* **Code Optimization** = Code movement, dead code, common sub expression
* **Intermidiate code generation** = Benefit / syntex tree / DAG / Postfix / 3 address code / Why it is machine independent? .[link](https://www.youtube.com/watch?v=j-bLeUysUiE&ab_channel=GateSmashers)
* **DAG \*\*\***
* DAG block of code

**Microprocessor**

**1st class (Chapter 4)**

* ~~Machine language~~
* ~~Opcode~~
* Mod (fig 4.5 projonto)
* 3 Table \*\*\*\*

**2nd class**

* Special addressing mode (fig 7,8,)
* Immediate instruction (fig 9)
* Segment register (fig 10)
* Push, pop (fig 15) \*\*\*

**3rd class**

* Fig 13
* POPA
* Initial Stack \*\*\*
* Load effective address \*\*\*\*
* Fig 3, fig 17,
* String data transfer
* Direction flag
* **String 5 instruction** = LODS, STOS, MOVS, INS, OUTS \*\*\*\*\*
* LAHF and SAHF
* in/ out

**(Chapter 5)**

* Register addition, immediate, memory to register, array addition and, addition with carry.

**4th class**

* DAC (Digital to analog converter)
* DAC calculation (V ref is given) [Math] \*\*\*\*
* The internal structure of DAC 0830 **(Diagram) \*\*\***
* ADC (Analog to Digital converter)
* Pinout ADC 0804
* Timing Diagram [Diagram] \*\*\*\*
* Analog input signal
* Generating Clock Signal

5th class

* Fixed address vs variable address

**Topic:**

**Chapter 4**

* **~~Special addressing mode (fig 7,8,)~~**
* **~~Immediate instruction (fig 9)~~**
* **~~Segment register~~** ~~(fig 10)~~
* Push/ Pop
* Initial Stack
* **LEA**
* **~~String 5 instruction~~** ~~= LODS, STOS, MOVS, INS, OUTS.~~
* ~~LAHF and SAHF~~

**Arithmetic and logical operation**

* ~~ADD, shift, rotate,~~

**DAC/ ADC**

* ~~DAC~~ **~~math~~** ~~(with input)~~
* **~~Internal Structure of DAC~~** ~~(~~**~~Diagram~~** ~~+ Description)~~
* **~~ADC Timing Diagram~~** ~~\*\*\* (~~**~~Diagram)~~**

**I/O Interface 1**

* Fixed vs Variable address
* ~~Isolated I/O vs Memory mapped I/O difference~~
* **~~Handshaking~~** ~~(what, example 11.1, assembly language)~~
* ~~12 Volt DC motor~~
* **~~Darlington~~****~~(Draw~~** ~~+ Explanation)~~

**I/O interface 2**

* Half-step Vs full-step difference
* Mode 1 strobe input strobe output (**timing diagram, figure**, explain)
* Table 11.2
* Fig 11.20 (Draw)
* Example 11.10

**Software Engineering**

**Economics**

**1st Class**

* Elasticity Demand and supply
* **5 types of Elasticity of Demand** = Elasticity Demand, Inelastic Demand, Unit elasticity Demand, Parfectly inlastic demand, Perfectly Elastic demand.
* **Formula** Price elasticity of Demand
* **Practice Math 1**

**2nd Class**

* **Practice Math 4**

**3rd class**

* Determinants of price elasticity of demand = substitutability, income, luxuries necessary
* Price elasticity of Supply
* Antiques goods, Volatile goods
* Cross Elastictity of Demands (positive, negative sign)
* **Practice Math 4**

**4th class**

* Cost of Production
* Explicit vs implicity

**Topic:**

**Chapter 13 | Cost of production**

1. What does the **production cost**?
2. **Explicit** vs **Implicit** 
   1. **Explicit costs** are out-of-pocket costs for a firm—for example, payments for wages and salaries, rent, or materials.
   2. **Implicit costs** are the opportunity cost of resources already owned by the firm and used in business—for example, expanding a factory onto land already owned.
3. **Economic profit** vs **Accounting profit**
4. Production function
5. **Marginal Product** = Marginal product is referred to as the **change in output** seen with **per unit change of input** while keeping all other f**actors of input constant**.
6. Demininsing MPL
7. Why MPL important?
8. Marginal Cost
9. Why marginal cost is important?
10. **Variable cost?** Variable costs are expenses that **change with production volume**.
11. **Fixed cost** = these costs remain the same whether there is zero production or running at full capacity.

**Macro Economics**

1. What is macro economics?

**Topics:**

**Microprocessor Lab**

Class 1,2 (Microprocessor kit work)

Class 3

* What is Data segment and code segment.
* DB, DW
* Valid or invalid syntex

Class 4

* Variable declare

Class 5

* XCHG (swaping two register)
* Increment, decrement, swap
* Upper value to lower value, lower value to upper value.

Class 6

* CMP AX,BX
* JE, JNE, JG

Class 7

* Shift and rotated
* Shift = left, right
* Rotated = left, right
* SHL,SHR, ROL,ROR