INT601 Computer System Concept

1. What is true for Mechanical Computer?
   A. Inertia gear hard to improve performance ✓
   B. Too many gear ✓
   C. Size very big ✓
   D. A, B, C Correct
   E. No correct answer

2. What is the popular method to measure performance of computer?
   A. Bandwidth
   B. MIPS
   C. Real Program ✓
   D. A, B, C Correct
   D. No correct answer

3. What are not performance constraints of a bus system?
   A. Data bus width
   B. Address bus width ✗ Address is about data
   C. Bus clock frequency
   D. A,C is correct
   E. No correct answer

4. How many check bits are required to implement SEC-SED for a 128-bit memory system?
   A. 5 bits
   B. 6 bits
   C. 7 bits
   D. 8 bits ✓
   E. No correct answer

5. How many check bits are required to implement odd parity detection for a 128-bit memory system?
   A. 1 bits ✓
   B. 4 bits
   C. 5 bits
   D. 6 bits
   E. No correct answer

6. What is classified as an attribute of Computer Architecture?
   A. Instruction Set ✓
   B. Memory Technology ✗ Memory system, because technology is a lot in market.
   C. I/O Mechanism ✓
   D. A and C are correct
   E. No correct answer

7. What Instruction Cycle does not need to access bus?
   A. Fetch → Fetch ต้องใช้ Bus.
   B. Decode ✓
   C. Execute ✓
   D. B and C are correct
   E. No correct answer

8. What is the size of the Program Counter Register (PC) for a 64 bit computer with 48 address line?
   A. 24
   B. 32
   C. 48
   D. 64
   E. No correct answer <= 48 Address line use 6 bits not 48 bits

   ☆ Use 6 bit of PC

9. What is an impact of interrupt to the computer system?
   A. Reduce CPU's speed
   B. Improve the computer system's performance ✓
   C. Promote parallel computation in computer system ✓
   D. B and C are correct ✓
   F. No correct answer

10. What memory component can maintain the data content without electronic power?
    A. DRAM
    B. Flash Memory ✓
    C. EEPROM ✓
    D. B and C are correct
    E. No correct answer

11. What characteristic of the Von Neumann Architecture the cache memory employs to increase the hit rate?
    A. Data and Instruction kept in memory
    B. Memory is addressable
    C. Instructions are executed in sequential fashion ✓
    D. A,B and C are correct
    E. No correct answer

12. What even can occur on a bus system?
    A. one to one data transmission ✓
    B. one to many data transmission ✓
    C. two to two data transmission
    D. A and B are correct ✓
    E. No correct answer

13. What is the fastest CPU?
    A. SUN SPARC 300 MIPS
    B. DEL ALPHA 400 MIPS
    C. PENTIUM II 300 MIPS
    D. No correct answer ✓

14. What is the characteristic of the von Neumann Architecture?
    A. Data and instruction kept in memory ✓
    B. Memory is addressable ✓
    C. Instruction are executed in sequential fashion ✓
    D. A, B and C are correct ✓
    E. No correct answer

15. What is an impact of interrupt to the computer system?

A. Reduce CPU's speed
B. Improve the computer system's performance ✓
C. Reduce the time to access harddisk
D. B, C Correct
E. No correct answer

16. Which component can be memory unit?
A. XOR gate ✓
B. Register
C. ALU
D. Decoder Unit
E. No correct answer

17. What is storage unit is classified as primary memory in computer system?
A. RAM ✓
B. CD
C. Harddisk
D. B, C Correct
E. No correct answer

18. What storage unit communicates directly with the CPU?
A. RAM ✓
B. CD
C. Harddisk
D. B, C Correct
E. No correct answer

19. What storage unit can maintain the data content without electrical power?
A. RAM
B. CD ✓
C. Harddisk ✓
D. B, C Correct ✓
E. No correct answer

20. What is directly the function of a cache memory?
A. Reduce the time CPU need to access main memory
B. Reduce the time CPU need to get next required data ✓
C. Reduce the time CPU need to access I/O
D. A, C Correct
E. No correct answer

21. What answer is the best match to a cache memory?
A. Calculate complex arithmetic function for CPU
B. Compensate for the speed differential between main memory access time and CPU ✓
C. Manage I/O unit for CPU
D. A, B, C Correct
E. No correct answer

22. What techniques does a cache use to improve the computer performance?
A. High speed memory ✓
B. Close to CPU

C. Locality of reference in program ✓
D. A, C Correct ✓
E. No correct answer

23. What write policy performance the fastest memory access?
A. Write through *<= Slowest but accuracy*
B. Write once
C. Write back ✓
D. Write any
E. No correct answer

24. Which RAID cannot recover data when a physical disk is fail?
A. RAID 1
B. RAID 2
C. RAID 3
D. RAID 5
E. No correct answer <= RAID 0

25. In RAID system, what should be the strip size, compared with the logical block?
A. Very small
B. Very larger
C. Equal
D. Any
E. No correct answer <= not sure

26. Which RAID cannot achieve high I/O request rate?
A. RAID 1
B. RAID 2 ✓
C. RAID 3 ✓
D. B, C Correct ✓
E. No correct answer

27. What event cannot occur on a bus system?
A. One to one data transmission
B. One to many data transmission
C. Two to two data transmission ✓
D. B, C Correct
F. No correct answer

28. What are performance constraints of a bus system?
A. Data bus width ✓
B. Address bus width
C. Bus clock frequency ✓
D. A, C Correct ✓
E. No correct answer

29. What is the most suitable to harddisk operation?
A. Constant angular velocity rotation ✓
B. Constant linear velocity rotation
C. Constant data density
D. A, C Correct

E. No correct answer

30. What is the most suitable to compact disk operation?
    A. Constant angular velocity rotation
    B. Constant linear velocity rotation ✓
    C. constant data density ✓
    D. B, C Correct ✓
    E. No correct answer

31. What device uses sequential access?
    A. Harddisk
    B. RAM
    C. Back-up tape ✓
    D. B, C Correct
    E. No correct answer

32. How many check bits are required to implement SEC-SED for a 32-bit memory system?
    A. 1
    B. 4
    C. 5
    D. 6 <= 2^k-1 > M+k ✓
    E. No correct answer

33. How many check bits are required to implement even-parity detection for 32-bit memory system?
    A. 1 ✓
    B. 4
    C. 5
    D. 6
    E. No correct answer

34. What is the sign-magnitude representation of -126?
    A. 11111111
    B. 10000000
    C. 11111110 ✓
    D. 01111110
    E. No correct answer

35. What is the 2's complement representation of -126?
    A. 11111111
    B. 10000010 ✓
    C. 11111110
    D. 01111110
    E. No correct answer

36. What number that can be represented by 8-bit 2's complement number?
    A. -32 ✓
    B. -128 ✓
    C. 0.55
    D. A, B are correct ✓
    E. No correct answer

37. What is the result of 11010001-101001 using 2's complement when both numbers are 2's complement representation number?
    A. 01101000
    B. 01101000
    C. 10101000
    D. 10000110
    E. No correct answer <= 11101000

38. What is the –1.5 using IEEE 32-bit floating point format?
    A. 3FC00000
    B. BFC00000 <= 1 00011111 10000000000000000000000 (-1.5 x 10^0 = -1.1 x 2^0)
    C. 80400000
    D. 80600000
    E. No correct answer

39. What memory management technique is not required to allow a process which is larger than physical main memory to run on a computer system?
    A. Swapping ✓
    B. Cache ✓
    C. Paging
    D. A, B are correct ✓
    E. No correct answer

40. What key memory management technique is required to allow multiprogramming on a computer system?
    A. Swapping ✓
    B. Cache ✓
    C. Paging
    D. A, B are correct ✓
    E. No correct answer

41. What is the problem if the page size in paging technique is very small?
    A. Too large page table ✓
    B. Waste memory space on memory management area
    C. Waste memory space on memory process area
    D. A, B are correct
    E. No correct answer

42. How many times does CPU access the main memory unit if a decode instruction uses an indirect addressing operand (exclude fetch cycle)?
    A. 0 E. No correct answer
    B. 1
    C. 2 ✓
    D. 3

43. What answer is the best suitable to define IDE in the personal computer?
    A. Bus
    B. I/O ✓
    C. CPU
    D. Memory
    E. No correct answer

44. Which is same result as (x+y)'

A. x'+y'
B. x+y
C. x'y' ✓
D. xy
E. No correct answer

45. What is sign magnitude represent at -96
=> *11100000*

46. What is the two's complement represent of -96
=> *10100000*

47. What is sign magnitude represent at –33
=> *10100001*

48. What is the two's complement represent of –33
=> *11011111*

49. What is sign magnitude represent at –35
=> *10100011*

50. What is the two's complement represent of –35
=> *11011101*

51. What is the two's complement represent of –128
=> *10000000*

52. What is the result of 11010001 – 1101001 using two's complement, where both numbers are two's complement representation
=> *11101000*

53. What number can be represented by floating point?
A. -35
B. $2x10^6$
C. 0.55
D. A, B and C correct ✓
E. No correct answer

54. What number cannot be represented by floating point? (Use choices from 53)
=> *E*

55. What number can be represented by 8-bit sign magnitude number?
A. 128
B. -128
C. 0.55
D. A, B and C Correct
E. No correct answer *<= 8 bits sign magnitude can represent from -127 to +127* ✓

56. What number can be represented by 8-bit 2's complement? (Use choices from 55)
=> *B* : −128

57. What instruction cycle need to access bus?
    A. Fetch ✓
    B. Decode
    C. Store result ✓
    D. A, B and C Correct
    E. No correct answer <= Fetch and Store result need access bus

58. Which part of CPU process the plus(+) operation?
    A. Control unit
    B. Register
    C. ALU ✓
    D. Decode unit
    E. No correct answer

59. Which part of CPU process the subtract(-) operation? (Use choices from 58)
    => *C : ALU*

60. Which component is a memory unit? (Use choices from 58)
    => *B* : Register

61. *RAM* is main memory.

62. Addressing mode มีดังนี้
    Immediate mode => ใช้ Address แทน Data *<= อันนี้ไม่มีการใช้ Address ของ memory*
    Direct mode => มีการอ้างอิงข้อมูลใน Address ของ memory 1 ครั้ง (Effective Address (EA))
    Indirect mode => มีการอ้างอิง Address 2 รอบ
    Register mode => ใช้ Address ที่อยู่ใน Register
    Register indirect mode => คล้ายๆ กับ Indirect mode แต่ว่า Address ใน register จะอ้างอิงไปถึงอัก address นึง
    Displacement mode => Base Address + offset
    Indexing mode => Base Address + offset

63. ข้อใดเกี่ยวข้องกับ Control unit? *<= Control unit มี 2 แบบ คือ แบบ hardware กับ software*
    A. Hardware ✓
    B. Microprogram ✓
    C. ALU
    D. A, B correct
    E. No answer

64. USB => *I/O*

65. PCI, SATA => *BUS*

66. IDE, SCSI => *I/O*

67. AMD K7 => *CPU*

68. NOR gate 2 inputs => *(X+Y)' = X'Y'*

69. CPU: Registers, ALU, Control Unit, Internal CPU Interconnection

70. X(Y+X) = XY+X = X(Y+1) = X(1) = X *<= มาจาก X AND X ได้ X และ อะไร OR กับ 1 ได้ 1*

71. X(1+Y) = X <= *เหมือนข้อ 70*

72. (XY)’ = (X’ + Y’)

73. Indirect Address เข้าถึง (Access Memory) กี่ครั้ง => *2 ครั้ง*

74. Direct Address เข้าถึง (Access Memory) กี่ครั้ง => *1 ครั้ง*

75. อะไรแทนด้วย 8 bit Sign-magnitude ได้ (-25) -128, 0.55) => *-25*

76. 11110000 – 10001001 = 01110111 (2’s complement)

77. อะไรให้คำจำกัดความเดียวกับ cache ได้ดีที่สุด => Cache พูดถึงแต่เรื่อง memory

78. วงจร adder ที่ทำการ subtract ด้วยการ add ใช้ gate ใด (AND, OR, *EX-OR*, EX-NOR, none of above)
Subtraction ใช้ NAND, การคูณใช้ EX-OR หลายๆ ครั้ง การหารใช้ลบหลายๆ ครั้ง

79. What is directly the function of a cache Memory?
=> *Reduce the time CPU need to get next required data*

80. Accumulator ทำหน้าที่ใด
=> *Accumulator เป็น register ภาคบังคับ, เป็น memory ตัวหนึ่งของ register (ตัวทด)*

81. Harddisk 20 GB ถ้าต้องการทำ RAID 5 ให้มีพื้นที่ 60 GB ต้องใช้ Harddisk กี่ลูก => *4 ลูก : 3+1*

82. RAID ใดสามารถ recovery disk fail 3 ลูก จาก Disk 10 ลูก => *RAID1*

83. ใครเป็นคนสร้าง Page Table => *O/S*

84. ใครเป็นคนเอา Page Table มาแปลจาก Logical Address เป็น Physical Address => *CPU*

85. ใครเป็นคนควบคุม Degree of Multiple Processing => *High Level Scheduler*

86. ใครเป็นคน Maximize Usage of CPU => *High Level Scheduler*

87. Queue ไหนที่ช่วยเพิ่ม Degree of Multiprocessing => *Long Term Queue*

88. Max Frame Size ที่พลาด ถ้า Page มีขนาด 4K คือเท่าไร => *4096 - 1 = 4095*

89. ให้ตัวตั้งและตัวคูณมา ถามว่าต้องทำการ Shift กี่ครั้ง => *นับจำนวน bit ของตัวคูณ*

90. ให้ตัวตั้งและตัวคูณมา ถามว่าใช้ Booth's Algorithm จะต้องทำ Substraction(-) กี่ครั้ง => *ดูที่ตัวคูณ : นับว่ามี 10 กี่ครั้ง : QnQn-1*

91. ให้ตัวตั้งและตัวคูณมา ถามว่าใช้ Booth's Algorithm จะต้องทำ Addtion(+) กี่ครั้ง => *ดูที่ตัวคูณ : นับว่ามี 01 กี่ครั้ง : QnQn-1*

92. I/O Address แบบไหนที่มีการ Share Address ระหว่าง Memory => *Isolated I/O*

93. ปัจจัยที่ทำให้เกิด Condition Branch => *Delay of each Stage, Latch, Branch*

94. การแก้ปัญหา Branch แบบใด ที่แก้ปัญหาการ Flushing ได้ => *Multiple Stream, Delay Branch*

95. การแก้ปัญหา Branch แบบใด ที่ CPU ไม่รู้เลยว่ามีการ Flushing เกิดขึ้น => *Delay Branch (ทำโดย Software: Compiler): Reorder Instruction*

96. Register ใดที่ทำหน้าที่ Next Instruction => *Program Counter*

97. Register ใดทีส่ง Address จาก CPU ออกไปยัง Bus => *MAR: Memory Address Register*

98. ส่วนประกอบสำคัญของ Instruction คืออะไร => *Operation Code, Source Operand Reference, Result Reference, Next Instruction Reference(Optional)*

99. ใน SuperScalar : Out-of-order Issue Out-of-order Completion ให้อะไรช่วย => *Window Buffering*

100. ใน SuperScalar : Output & Anti Dependency ใช้อะไรแก้ปัญหา => *Register Renaming*

<u>โจทย์</u> Memory 1 M เป็นแบบ 32 bit word มี Register 32 ตัว Addressing แบ่งเป็น 4 part คือ an indirect bit, Address part, Register part, Op code part

คำถาม

Op code	Register	Indirect bit	Memory Address
6	*5*	1(โจทย์บอกมา)	*20*

32 bit

1. Address part ใช้กี่บิต => *20 bit (2^{20} = 1 M)*
2. Register part ใช้กี่บิต => *5 bit (2^5 = 32)*
3. Op code part ใช้กี่บิต => *6 bit (32-20-1-5 = 6)*
4. Op code มีได้กี่คำสั่ง => *64 (2^6 = 64)*
5. IR register มีขนาดกี่บิต => *32 bit (IR: Instruction Register เก็บ Instruction)*
6. PC register มีขนาดกี่บิต => *20 bit (PC มีขนาดเท่ากับ address)*

INT602 Design and Analysis of Algorithms

1. Recursive: 4 basic rules
   - Base case : must always have some base cases
   - Making progress : makes progress toward a base case
   - Design rule : all recursive calls work
   - Compound interest rule : never duplicate work

2. Greedy algorithm: Dijkstra's algorithm, Prim's algorithm, Kruskal's algorithm => Not Recursive

3. for i= 1 to N do
   for j = 1 to N^2
   => *$O(N) = N^3$*

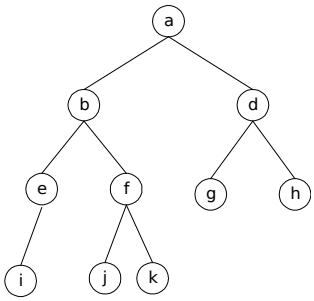
4. for i = 1 to N do
   for j = 1 to N
   => *$O(N) = N^2$*

5. for i = 1 to N do
   for j = 1 to N/2
   => *$O(N) = N^2/2$*

6. อะไรที่ไม่ถูกต้อง(fault) เกี่ยวกับ Recursive
   A. readable (อ่านง่าย)
   B. ใช้ Memory มากกว่า non-recursive
   C. Any case most have base cases <= Must not most
   D. …
   E. All above are false

7. ข้อใดไม่ใช่การแก้ปัญหา Collision ใน Hashing (choice ไม่ใช่แบบนี้ แต่ได้ความหมายแบบนี้น่ะ)
   A. linear probing
   B. rotation
   C. rehashing
   D. special hashing system
   E. All of above

8. Function ที่ใช้ในการทำ hash function => *Truncation, folding, Modular arithmetic*

9. 

   Infix order => *i, e, b, j, f, k, a, g, d, h*
   Postfix order => *i, e, j, k, f, b, g, h, d, a*

Prefix order => *a, b, e, i, f, j, k, d, g, h*

10. AVL tree => *ความสูงของ Left subtree และ Right subtree ต่างกันไม่เกิน 1 สำหรับทุกๆ node*

11. *Insertion* is the most difficult for AVL tree

12. การ sort แบบใดดีที่สุด
    A. Radix Sort
    B. Insertion Sort
    C. Selection Sort
    D. Shell Sort
    E. Same Performance

13. Sort แบบใดที่ใช้หลักการ divide and conquer
    A. Selection Sort
    B. Insertion Sort
    C. Radix Sort
    D. Shell Sort
    E. None of above <= Example of divide and conquer is Merge sort

14. Worst case for insertion sort => *$O(N^2)$ มีการสลับตำแหน่งทุกตัว*

15. *Insertion sort* is the least efficient

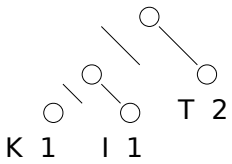
16. Selection sort มีการย้ายตำแหน่งของตัวอ่านมากสุดไปไว้ท้ายสุด หรือ น้อยสุดไปไว้หน้าสุด

17. 3, 2, 5, 1, 8, 9, 10 เลือก Pivot ที่เป็น Median ได้อะไร => *1 (ค่าตรงกลาง ของชุดข้อมูล)*

18. 3, 2, 5, 1, 8, 9, 10 เลือก Pivot ที่เป็น Median of Three ได้อะไร => *3 (3, 1, 10 => Choose 3)*

19. ถ้าให้ข้อมูลมา 1 ชุด ให้ใช้ค่ากลางเป็น Pivot ให้เอาค่าน้อยกว่าค่าตรงกลางไปทางซ้าย ค่ามากกว่าไปทางขวา

20. ให้เขียน Tree Huffman Code ของ KITT *(เอา K กับ I มา merge กันก่อน แล้วค่อยไป merge กับ T)*



21. Graph ใดไม่เป็น Euler Circuit => *ให้นับ degree ของแต่ละ node จะต้องเป็นคู่หมด ถ้าเป็นเลขคี่ ต้องมีเลขคี่แค่ 2 อันเท่านั้น*

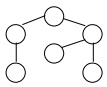
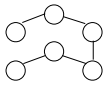
22. หา Shortest path จากรูปที่ให้มา แล้วพิจารณาตาราง Result (v known, dv, pv) ใดถูกต้อง) => *อันนี้ต้องไล่ตารางเอาทีละอัน เริ่มจากจุดเริ่มต้น ให้ known เป็น 1 แล้ว จากนั้นก็ทำ enqueue – dequeue ไปทีละอัน โดยค่อยๆ เอา node ที่รู้แล้วออกจากกราฟ*

23. โจทย์ให้รูป flow มาแล้ว มี choice เป็นรูป flow ให้ 4 ข้อ ถามว่า ข้อไหนที่วาดแล้วเป็น maximum flow ของโจทย์ => *อันนี้ต้องไล่ algorithm เหมือนกัน*

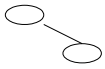
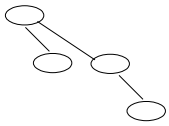
24. จำนวน node ของ Heap ที่มีความสูง h => *จำนวน node ที่มากที่สุด = $2^{h+1} - 1$*
    จำนวน node ที่น้อยที่สุด = 2^h

25. Topological order => *ต้องไปลองใส่ algorithm แต่ห้ามเป็น Circle เด็ดขาด*

26. B-tree order M : จะมีคุณสมบัติดังนี้
    - Root หรือ leaf จะมี child ระหว่าง 2 < M
    - All nonleaf node (except root) have between M/2 and M children
    - All leaves are at the same depth
    - B-tree order 4 is more popular know as a 2-3-4 tree

27. Spanning tree ของ กราฟ 
    Spanning tree: ทุก node มีเส้นทางเชื่อมกัน เช่น  หรือ 

28. การ sort แบบใดที่ต้องมีการหาค่า Pivot => *Quicksort*

29. Binomial Queue => B_0  B_1  B_2 

    => *ให้คำนวณจำนวน node ด้วยว่ามีกี่ node เพื่อจะได้ตอบได้ว่า มันต้องเป็น Binomial Queue รูปไหน*

30. กราฟในข้อใดเป็น Strong connected => *vertex ทุกอันจะมีอย่างน้อย 1 path ที่ไปยัง vertex อื่นได้ทุก vertex ใน Graph*

31. ข้อใดถูก
    A. Siblings have same depth
    B. Tree สามารถเป็น circuit
    C. ความลึกของ root เท่ากับ height ของ tree
    D. Non-terminal node รู้จักกันว่าเป็น leaves
    E. ถูกทุกข้อ

32. จากรูป AVL tree ต้องทำ Rotate แบบใด => *Single Rotate : (LL), (RR)*
    Double Rotate : (LR), (RL)

33. Binary Tree คือ tree ที่มี node 2 node โดยที่ node ทางซ้ายมีค่าน้อยกว่า node ทางขวา ผิด *ที่ถูกคือ Binary Search Tree*

34. ข้อใดเป็น Priority Queue => *Binary heap*

35. Prim's Algorithm => *ใช้หา spanning tree ที่เป็นตาราง known, dv, pv*

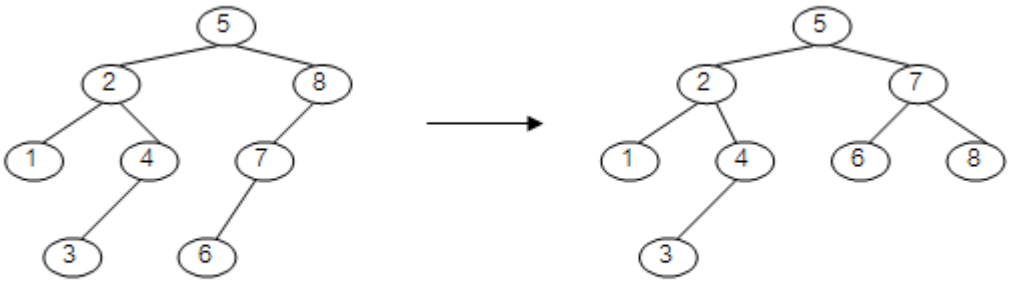
36. Kruskal's algorithm => *ใช้หา spanning tree เหมือนกัน แต่เลือกอันที่ cost น้อยๆ มาเทียบกันทีละคู่*

37. Find routine with short-circuit

```
Function Find(X:ElementType; L:List) : Position
var
    P:Position ;
Begin
    P:L^.Next ;
    While  P<> nil  and .....  do
    P:= P^.Next ;
    Find:= P;
End;
```

=> *(P^.Element <> X)*

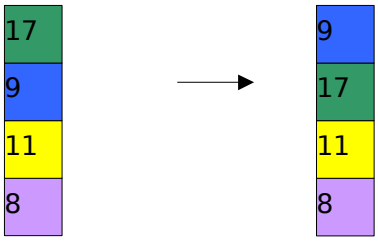
38.



Before rotation

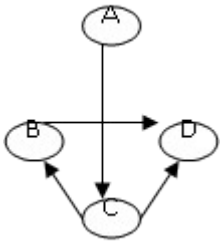
After rotation case 1

39. Insertion Sort หลังจาก Sort ขั้นที่ 1 แล้วเป็นอย่างไร



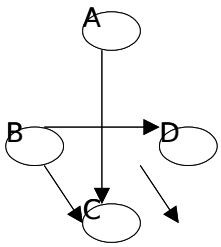
40. Merge Sort, Quick Sort => *Divide and Conquer*

41. What is topological order of the following graph?



=> *A C B D*

42. ข้อเสียของ separate chaining
=> *การค้นหาข้อมูลซ้ำ*



INT603 Organization Information System

1. Stages of decision making:
   Intelligence: Collect information; identify problem
   Design: Conceive alternatives; select criteria
   Choice: Use criteria to evaluate alternatives; select
   Implementation: Put decision into effect; allocate resources; control

2. Characteristics of Information Processing Systems:
   ESS: Senior managers
   DSS: Professionals; staff managers
   MIS: Middle managers
   KWS: Professionals, technical staff
   Office systems: Clerical workers
   TPS: Operations personal; supervisors

3. Value chain model: Model that highlights the primary or support activities that add a margin of value to firm's products or services where information systems can best be applied to achieve a competitive advantage

4. Summary and exception reports => *MIS*

5. Key groups complete and bargain Organizational models of decision making:
   - Bureaucratic: Follow standard operating procedures (SOP)
   - Political: Key groups compete and bargain
   - Garbage Can: Organizations not rational; solutions accidental

6. DATA: STREAMS OF RAW FACTS REPRESENTING EVENTS SUCH AS BUSINESS TRANSACTIONS

7. INFORMATION: CLUSTERS OF FACTS MEANINGFUL & USEFUL TO HUMAN BEINGS IN PROCESSES SUCH AS MAKING DECISIONS

8. Important thing in TPS => *Data*

9. *Management Information System (MIS)*: Information systems at the management level of an organization that serve the functions of planning, controlling, and decision making by providing routine summary and exception reports

10. *Structured decisions*: Decisions that are repetitive, routine, and have a definite procedure for handling them.
    Unstructured decisions: Nonroutine decisions in which the decision maker must provide judgment, evaluation, and insights into the problem definition; there is no agreed-upon procedure for making such decisions.

11. Report Oriented => *MIS*

12. Model Oriented => *DSS*

13. *Standard Operating Procedures (SOPs)*

- Formal rules for accomplishing tasks that have been developed to cope with expected situations.
- Precise rules, procedures, and practices developed by organizations to cope with virtually all expected situations.

14. *Garbage can model* => Decision making is largely accidental and is the product of a stream of solutions, problems, and situations that are randomly associated

15. *Individual models of decision making*
    - Rational: Comprehensive rationality; evaluate all alternatives
    - Systematic: Structured, formal method
    - Intuitive: Trial & error, unstructured, multiple approaches

16. *Competitive forces model* => Model used to describe the interaction of external influences, specifically threats and opportunities that affect an organization's strategy and ability to compete

17. *Product differentiation* (การผลิตสินค้าที่แตกต่าง เช่น Citibank: ATM): Competitive strategy for creating brand loyalty by developing new and unique products and services that are not easily duplicated by competitors
    Focused differentiation (การเจาะกลุ่มเป้าหมาย เช่น Owen, Coca-cola): Competitive strategy for developing new market niches for specialized products or services where a business can compete in the target area better than its competitors

18. *Structured decisions* => Decisions that are repetitive, routine, and have a definite procedure for handling them

19. *Unstructured decisions* => Nonroutine decisions in which the decision maker must provide judgment, evaluation, and insights into the problem definition; there is no agreed-upon procedure for making such decisions

20. *Health Risks*
    - Repetitive Stress Injury (RSI): Occupational disease that occurs when muscle groups are forced through repetitive actions with high-impact loads or thousands of repetitions with low-impact loads.อาการบาดเจ็บที่มาจากความเครียดในการทำงานซ้ำๆ เช่น การพิมพ์งาน -> ปวดข้อ ปวดคอ ปวดหลัง
    - Carpal tunnel syndrome (CTS): เกิดจากการใช้ keyboard/mouse ซึ่งต้องมีการสั่งงานจากระบบประสาท
    - Computer Vision Syndrome (CVS): Eye strain condition related to computer display screen use, with symptoms including headaches, blurred vision, and dry, irritated eyes. ปวดตา เนื่องจากมองจอนาน เป็นอาการเพียงชั่วคราวเท่านั้น รวมทั้งอาการปวดหัว มองไม่ชัด ตาแห้งและระคายเคือง
    - Techno stress: Stress induced by computer use, with symptoms including aggravation, hostility toward humans, impatience, and enervation. เกี่ยวกับจิตวิทยาที่เกิดจากความเครียดในการใช้ technology เช่น irritation, hostility, impatience, enervation, fear
    - VDT Radiation: การแผ่รังสีจากจอภาพ

21. Unstructured decision => *ESS*

22. *Supply chain management* => integrates supplier, distributor, and customer logistic requirements into one cohesive process to reduce time, redundant effort, and inventory costs.

23. *Switching cost* => The expense a customer or company incurs in lost time and expenditure of resources when changing from one supplier or system to a competing supplier or system.

24. *White-collar* => ใช้ความรู้ทางด้าน IT ในการทำงาน
Blue-collar => ทำงานในโรงงาน

25. การนำ ATM มาใช้ ของ Citibank เป็นการใช้ strategic แบบใด
A. Product difference
B. Focus difference
C. Low cost
D. nich market
E. ไม่ใช้ทั้งหมด

26. *Organizational Structures*
- Entrepreneurial structure: Young, small firm e.g. Small start-up business
- Machine bureaucracy: Large bureaucracy e.g. Midsize manufacturing firms
- Division bureaucracy: Combination of multiple machine bureaucracies e.g. Fortune 500 firms such as General Motors
- Professional bureaucracy: Knowledge-based organization e.g. Law firms, school systems, hospitals
- Adhocracy: Task force organization e.g. Consulting firms such as the Rand Corporation

27. Stockless inventory เกิดจากการใช้ information system แบบไหน => *SCM (Supply Chain Management)*

28. Datamining เกี่ยวข้องกับหน่วยงานใด => *Sale and Marketing*

29. *Primary activities* => are most related to the production and distribution of the firm's products and services that create value for the customer.
Support activities => make the delivery of the primary activities possible and consist of organization infrastructure (admin and management), human resources, technologies and procurement.

30. *Ethics* => Principles of right and wrong that can be used by individuals acting as free moral agents to make choices to guide their behavior.

31. Who are responsible for monitoring the firm's day-to-day activities? => *Operational managers*

32. *Strategic Information System (SIS)* => Computer systems at any level of the organization that change goals, operations, products, services, or environmental relationships to help the organization gain a competitive advantage

33. *Chief Information Officer (CIO)* => Senior manager in charge of the information systems function in the firm

34. *Direct cutover* => A risky approach where the new system completely replaces the old one on an appointed

35. *Data workers* => People, such as secretaries or bookkeepers, who process the organization’s paperwork

36. ข้อใดไม่อยู่ใน CRM (sale, manufacturing, *marketing*, service)

37. *Customer Relationship Management (CRM)* => Business and technology discipline to coordinate all of the business process for dealing with customers

38. *Enterprise System (ERP)* => Firmwide information systems that integrate key business processes so that information can flow freely between different parts of the firm

39. *Virtual organization* => การใช้ข้อมูลเดียวกันร่วมกัน เช่น Sale, Call Center

40. *Technical Approach* => Computer Science, Management Science, Operation Research

41. องค์กรที่เป็น flat organization จะตัดคนส่วนใดออก => *Middle Management*

42. *Information Architecture* => The particular design that information technology takes in a specific organization to archive selected goals or functions

43. Low risk, Low return ตรงกับข้อใด => *Automation*

44. *Five Moral Dimensions of the information age*
    - Information Rights and Obligations: สิทธิและหน้าที่ในการนำข้อมูลไปใช้
    - Property Rights: ทรัพย์สินทางปัญญา
    - Accountability and control: ความรับผิดชอบและการควบคุม
    - System Quality: คุณภาพของระบบ
    - Quality of Life: คุณภาพของชีวิต

45. แนวคิดใดต่อไปนี้ที่สอดคล้องกับคำกล่าวที่ว่า ได้ผลตอบแทนสูง แต่มีความเสี่ยงในการทำงานมากกว่าหรืออาจตกงานได้ง่ายกว่า Reengineering (Rationalization of procedures, *Paradigm shift*, ...)

46. *Outsourcing* => The practice of contracting computer center operations, telecommunications networks, or applications development to external vendors.

INT604 Database Management System

1. Database administrator's duties include:
   - Schema definition
   - Storage structure and access method definition
   - Schema and physical organization modification
   - Granting user authority to access the database
   - Specifying integrity constraints
   - Acting as liaison with users
   - Monitoring performance and responding to changes in requirements

2. Data Manipulation Language (DML):
   - Procedural languages
     - Specify HOW the output of a DML statement is to be obtained
     - Typically operate on one record at a time
     - Pascal, VB, C++, Java, Relational Algebra, Fortran, Cobol, Lisp
   - Non-procedural (declarative) languages
     - Specify only WHAT output is to be obtained for a DML statement
     - The part that retrieves data is called a query language
     - SQL, Prolog, Datalog, Relational Tuple Calculus (e.g. Quel), Relational Domain Calculus (e.g. QBE Query by Example)

3. ตัวอย่างของ multi-value => *telephone, address, nickname*

4. ความหมายของ transaction
   A. Smallest unit of database operation
   B. Smallest unit of SQL statement
   C. Smallest unit of work must fail and success together
   E. access set of the same data

5. E-R Diagrams:
   - Rectangles represent entity sets.
   - Diamonds represent relationship sets.
   - Lines link attributes to entity sets and entity sets to relationship sets.
   - Ellipses represent attributes
     - Double ellipses represent multivalued attributes.
     - Dashed ellipses denote derived attributes.
   - Underline indicates primary key attributes

6. ข้อใดไม่ถูกกำหนดให้ใช้ใน aggregate
   A. order by
   B. group by
   C. having
   D. min

7. ข้อใดใช้ได้เหมือนกับการ intersection
   A. Set difference
   B. Union
   C. cartesian product
   D. B and C
   E. A and C
8. Outer Join:
   - An extension of the join operation that avoids loss of information.

- Computes the join and then adds tuples form one relation that does not match tuples in the other relation to the result of the join

9. Which is not SQL keyword to nested queries?
   A. like
   B. in
   C. all
   D. unique
   E. exists

10. DBMS ทำงานเหมือน virtual memory management คือหน้าที่ใด
    A. Lock
    B. Index
    C. Buffer
    D. Store
    E. Recovery

11. มี 1000000 records being indexed with B+-tree 100 effort fanout access disk กี่ครั้ง
    A. 2
    B. 4 <= $log_{n/2}$ k = $log_{100/2}$ 1000000 => 4
    C. 50
    D. 100
    E. 500

12. การใช้ Distinct => *SELECT [DISTINCT] ... FROM ... WHERE ... => DISTINCT หมายถึงต้องซ้ำทุกๆ column ด้วย*

13. การลบใช้คำสั่ง Drop
    - Dropping a Table => *DROP TABLE table;*
    - Dropping a Column => *ALTER TABLE table DROP COLUMN column;*

14. ข้อใดถูกเกี่ยวกับ concurrency control
    A. Access ข้อมูลเดียวกับในเวลาเดียวกันได้
    B. Execute ได้ทีละหนึ่ง transaction โดยไม่ถูก interrupt โดยอันอื่น
    C. เมื่อ database crash สามารถ recovery ได้
    D. ผลลัพธ์ของ transaction จะไม่ interfere อันอื่น

15. Jim Gray ได้รางวัล Nobel ด้าน computer science สาขาใด
    A. object
    B. Relational Database
    C. ER
    D. Data warehousing
    E. Transaction data

16. Null คืออะไร => *Missing ,Unknown or does not exist, x=0 แทนกับ Null ไม่ได้*

17. 2NF => No Partial Dependency, 3NF => 2NF + No Transitive Dependency

18. คุณสมบัติของ Transaction
    - ***A***tomicity: all operations of the transaction -> complete or not happen at all
    - ***C***onsistency: ความถูกต้องของข้อมูล, ข้อมูลต้องไม่ขัดแย้งกัน

- ***I***solation: Concurrency Control สำหรับแต่ละ Transaction ทำงานพร้อมกัน ต้องเป็นอิสระจากกัน
- ***D***urability: Transaction ที่ทำแล้วต้องไม่สูญหายไปไหน ต้องคงทนถาวร ซึ่ง DB ต้องรับผิดชอบเรื่อง how to protect

19. Purpose of Database System:
    - In the early days, database applications were built on top of file systems
    - Drawbacks of using file systems to store data:
        - Data redundancy and inconsistency
        - Difficulty in accessing data
        - Data isolation — multiple files and formats
        - Integrity problems
        - Atomicity of updates
        - Concurrent access by multiple users
        - Security problems
    - Database systems offer solutions to all the above problems

20. การกำหนด Security ใน SQL นอกจากที่ View ยังสามารถกำหนดในรูปแบบใดได้อีก
    - Granting of privileges : grant … on … to …
      revoke … on … from … [restrict | cascade]
      to prevent cascading by specifying restrict
    - Roles : create role …
      grant … to …

    **SQL does not support authorization at a tuple level

21. Security - protection from malicious attempts to steal or modify data.
    - Database system level
        - Authentication and authorization mechanisms to allow specific users access only to required data
        - We concentrate on authorization in the rest of this chapter
    - Operating system level
        - Operating system super-users can do anything they want to the database! Good operating system level security is required.
    - Network level: must use encryption to prevent
        - Eavesdropping (unauthorized reading of messages)
        - Masquerading (pretending to be an authorized user or sending messages supposedly from authorized users)
    - Physical level
        - Physical access to computers allows destruction of data by intruders; traditional lock-and-key security is needed
        - Computers must also be protected from floods, fire, etc.
    - Human level
        - Users must be screened to ensure that an authorized users do not give access to intruders
        - Users should be trained on password selection and secrecy

22. *Weak entity* => an entity set that does not have a primary key

23. *Attribute* => descriptive properties possessed by all members of an entity set

24. ถ้าต้องการเก็บ log record ของ DB จะใช้ raid ใด => *RAID 1*

25. 2PL คืออะไร => *Two-Phase Locking protocol*

- A 2PL protocol guarantees conflict serializability of schedules.
- 2PL guarantees that any data item that a transaction accessed won't be modified by other transactions until that transaction has accessed all data items it needs.

26. การเปลี่ยนแปลง schema ของ DB จะไม่มีผลกระทบกับการเขียนโปรแกรม

27. ประโยชน์ของ check point
    - ลด overhead ในการ search log and redo transaction
    - ส่วนที่อยู่เหนือ checkpoint ไม่ต้อง undo/redo
    - รับประกันข้อมูลใน data disk ว่าตรงกับ log disk

28. candidate key ของ R(A,B,C,D) ที่มี set เป็น (AB -> C, B -> D, CD -> A) => *AB, CDB*

29. *Serializability* of a schedule guarantees isolation property of transactions in the schedule

30. The steps of query processing and information needed for each step.
    a) Query Parsing: check the syntax and validate the relations and attributes. It needs information in the data dictionary.
    b) Query Translation: translate user's query into an internal representation of the query. It needs information in the data dictionary as well.
    c) Query Optimization: generate query plans and choose the optimal plan to execute the query. It needs statistical information of the data. This step is an optional step.
    d) Query evaluation: evaluate the query and return the answer set to the user. It needs to access the data stored in the database

31. อะไรไม่ใช่ model (network, Hierachy, ER, Relationship, Object) => *ER*

32. *Equi-join* – a join in which the joining condition is based on equality between values in the common columns; common columns appear redundantly in the result table
    Natural join – an equi-join in which one of the duplicate columns is eliminated in the result table

33. *Foreign Key* is a key from another table that refers to (or targets) a specific key, usually the primary key, in the table being used. A primary key can be targeted by multiple foreign keys from other tables. But a primary key does not necessarily have to be the target of any foreign keys

34. เรียงลำดับต่อไปนี้ ข้อใดถูกต้อง (database, data mining, data warehousing) => *Database -> data warehousing -> data mining*

35. Tuple คืออะไร => *Row or Record*

36. *Domain* => the set of permitted values for each attribute

37. *Entity integrity* => Primary Key : Unique + Not Null

38. R1 (A B C D), R2 (AB) => *Foreign Key = AB*

39. คำสั่งเปลี่ยนแปลง Data ใน Tuple => *update*

40. *BCNF* => Boyce-Codd Normal Form

41. จำกัดให้เห็น View, tuple => *Security*

42. Tuning process เกี่ยวกับอะไร => *disk access*

43. Add column ใน SQL ใช้คำสั่งอะไร => *Alter*

44. Attribute เทียบเท่ากับอะไรใน File => *Field or Column*

45. Selection ในภาษา SQL ตรงกับอะไรใน Relation algebra
    - Selection
    - Join
    - *Projection*
    - Cartesian product

46. ORDB (Object Relational Database) แตกต่างจาก OODB (Object Oriented Database) อย่างไร
    - ORDB เก็บ table ในรูปของ Object แต่ OODB ไม่ใช่
    - *ORDB เก็บ Object ใน table แต่ OODB ไม่ใช่*

47. Datatype ใดที่ใช้เก็บข้อมูลที่เป็น multi-value
    - *array*
    - blob
    - clob
    - char

48. ข้อใดที่ไม่ใช่ Declarative language
    - relational calculus
    - SQL
    - QBE
    - *Relational algebra <= เพราะเป็น procedural language*

49. คุณสมบัติใดที่สามารถพบได้ (exists) ใน 1NF
    - partial dependency
    - transactive dependency
    - trivial dependency
    - join dependency
    - *None all above*

50. ข้อใดที่ช่วยเรื่อง I/O performance
    - *index structured*
    - transaction processing
    - memory management

51. Read Committed, Read Uncommitted
    Normal (Read Committed) อ่านค่าจากที่ commit แล้ว
    Read Uncommitted อ่านจากยังไม่ commit ก็ cascade rolling
    ***อ่านจากยังไม่คอมมิดแล้วคอมมิดก่อน อันนี้ผิด ไม่ได้

INT605 System Analysis and Design

1. *Systems analyst* => Facilitates the development of information systems and computer applications by bridging the communications gap that exists between nontechnical systems owners and users and technical systems designers and builders; facilitators of the development of information systems and computer applications; studies the problems and needs of an organization to determine how people, data, processes, communications, and information technology can best accomplish improvements for the business; facilitate the development of information systems and computer applications by bridging the communications gap that exists between nontechnical system owners and users and technical system designers and builders.

2. *System users* => Actually use the system to perform or support the work to be completed. System users define the business requirements and performance expectations for the system to be built; people who use or are affected by the information systems on a regular basis–capturing, validating, entering, responding to, storing, and exchanging data and information. A common synonym is client.

3. *Data* is raw facts about the organization and its business transaction must information has little meaning and use by itself.

4. *Prototype* is a technique for quickly building an information but incomplete model of information using RAD tools.

5. The technical design of business process to be automated or supported by computer program to be written by system building is known as *Software specification*

6. The first principle of system development method is *find out the problem*.

7. What is not benefit of CASE?
   a.) Improve productivity
   b.) Improve quality
   c.) Better document
   d.) Improve performance
   e.) Methodology that really work

8. *Cause-and-effect analysis* => A technique in which problems are studied to determine their causes and effects.

9. *Opportunity* => Chance to improve the organization even in the absence of specific problems.

10. *Gantt chart* => A simple horizontal bar chart that depicts project tasks against a calendar. Each bar represents a named project task. The tasks are listed vertically in the left-hand column. The horizontal axis is a calendar timeline.

11. *Model* => A representation of either reality or vision. Just as "a picture is worth a thousand words," most models use pictures to represent the reality or vision.

12. *Decomposition* => The act of breaking a system into its component subsystems, processes, and subprocesses. Each level of abstraction reveals more or less detail (as desired) about the overall system or a subset of that system.

13. *Primary key* => A field whose values identify one and only one record in a file; that candidate key that will most commonly be used to uniquely identify a single entity instance.

14. *Data Dictionary* => is a collection of data about the data.

15. *Project manager* => An automated tool to help plan system development activities (preferably using the approved methodology), estimate and assign resources (including people and costs), schedule activities and resources, monitor progress against schedule and budget, control and modify schedule and resources, and report project progress.

16. *Logical models* => Show what a system is or does. They are implementation-independent; that is, they depict the system independent of any technical implementation. As such, logical models illustrate the essence of the system. Popular synonyms include essential model, conceptual model, and business model.

17. *Balancing* => The synchronizing of data flow diagrams at different levels of detail to preserve consistency and completeness of the models. Balancing is a quality assurance technique.

18. *Feasibility study* => The measure of how beneficial or practical the development of an information system will be to an organization.

19. *Context diagram* => Defines the scope and boundary for the system and project. Because the scope of any project is always subject to change, the context diagram is also subject to constant change. A synonym is environmental model.

20. *Activity diagrams* => Graphically depict the sequential flow of activities of either a business process or a use case. They also can be used to model actions that will be performed when an operation is executing as well as the results of those actions.

21. The objective of *Analysis* is to determine what the system must do.

22. *Attribute* is a property of an entity.

23. *Methodology* is a set of processes used in the context to clearly defined steps that end with specific, measurable exit criteria.

24. สิ้นสุดหน้าที่ของการ Analyst มีการ sign-off แต่ยังคงมีการ train end user ถือว่าอยู่ในขั้นใด => *Implementation*

25. *Functional requirement* => A description of activities and services a system must provide; A function or feature that must be included in an information system to satisfy the business need and be acceptable to the users.

26. *Data flow diagram (DFD)* => A tool that depicts the flow of data through a system and the work or processing performed by that system. Synonyms include bubble chart, transformation graph and process model.

27. *Behavior* Refers to those things that the object can do and that correspond to functions that act on the object's data (or attributes). In object-oriented circles, an object's behavior is commonly referred to as a method, operation, or service.

28. A requirement that does not conflict with other requirement => *consistent*

29. *Entity* => A class of persons, places, objects, events, or concepts about which we need to capture and store data. Formal synonyms include entity type and entity class.

30. *Problems* => Undesirable situations that prevent the organization from fully achieving its purpose, goals, and/or objectives.

31. Prototype อยู่ในขั้นตอนใด => *Analyst*

32. *Problems* => Undesirable situations that prevent the organization from fully achieving its purpose, goals, and/or objectives.

33. *Process* => Work performed on, or in response to, incoming data flows or conditions. A synonym is transform.

34. Feasibility อยู่ใน Phase ใด => *Analyst*

35. *Computer-aided systems engineering (CASE*) => Tools that are software programs that automate or support the drawing and analysis of system models and provide for the translation of system models into application programs

36. *Ishikawa diagram* => A graphical tool used to identify, explore, and depict problems and the causes and effects of those problems. It is often referred to as a *cause-and-effect diagram* or a *fishbone diagram*.

37. *Repository* => A database where system developers store all documentation, knowledge, and products for one or more information systems or projects.

38. *ERD: Entity Relationship Diagram*
    - An entity relationship diagram is a graphical representation of an organisation's data storagerequirements.
    - Entity relationship diagrams are abstractions of the real world which simplify the problem to besolved while retaining its essential features.
    - Entity relationship diagrams are used to:identify the data that must be captured, stored and retrieved in order to support the businessactivities performed by an organisation; andidentify the data required to derive and report on the performance measures that anorganisation should be monitoring.