University of Baghdad

College of Science
Department of Computer Science

الأسم الكامل:

M.Sc. Qualification Exam

Date: 13 Aug. 2015

Time: 3 hrs.

Notes:

- **Answer All Questions.**
- **Answer in English.**
- **It is not allowed to consult any information during the exam, depend on your own knowledge and on the clarifications given by assistants.**

Q. Number	Mark (Numbering)	Mark (Written)
Q1		
Q2		
Q3		
Total		
Out of	100	

Q1	**Answer with either <u>True</u> or <u>False</u>.** **(30 Marks)** **Do not use T, ✓, F, or ×. Use only True and False to represent your answers.**	**Answer**
1.	**In a counter-controlled while loop, it is not necessary to initialize the loop control variable.**	
2.	**Suppose that x, y, and z are int variables, and x = 10, y = 15, and z = 20. Then, the expression (x < = y - 2) && (y > = z) || (z - 2 != 20) will be evaluated to true.**	
3.	**Suppose $A \subset S$. The complement of set A is the set containing all elements in A but not in S.**	
4.	**Stack can be used to perform recursion function.**	
5.	**The infix expression (A / 2 – D) ^ (E + 4) is equivalent to A 2 / D – E 4 + ^ .**	
6.	**The underflow in queue occur when front equal to rear.**	
7.	**An object may be defined within a function F1, in this case it is accessible by the function F1 and the main function.**	
8.	**Automatas $M1$ and $M2$ are said to be equivalent if and only if $\left(L(M1) \cap \overline{L(M2)}\right) \cup \left(\overline{L(M1)} \cap L(M2)\right) = \emptyset$.**	
9.	**A syntax analyzer is a program obtains a string of tokens from the lexical analyzer and verifies whether or not the string can be generated by a regular expression.**	
10.	**In linear data structure, each and every element has unique predecessor and unique successor.**	
11.	**The binary search is the standard algorithm for searching through a sorted sequence with $O(\log(n))$.**	
12.	**Related fields in a database are grouped to form a data record.**	
13.	**In DB, the full form of DDL is Dynamic Data Language.**	
14.	**Join operation does not require the participating tables to be union-compatible.**	
15.	**Software key-loggers are programs that silently capture all keystrokes, including passwords and sensitive information.**	

16.	**A macro virus is platform independent**	
17.	**RSA is a public key cryptographic algorithm. In case one loses the private key, it is possible to reconstruct it from the public key.**	
18.	**Physical is the logical or program address that the process uses. Whenever the CPU generates an address, it is always in terms of physical address space.**	
19.	**Any expert system should contain inference engine, knowledge base, and user interface.**	
20.	**"A ship is any vehicle that floats on water." can be represented by PROLOG rule as: ship(X):- vehicle(X), floats(X, water).**	
21.	**Artificial intelligence shows best on complex problems for which general principles don't help much.**	
22.	**Server may have dynamic IP provided by DHCP.**	
23.	**Email messages traffic can tolerate delay of packets.**	
24.	**P2P is a network edge model works without dedicated server.**	
25.	**Virtual machine is used to run more than one program on one computer.**	
26.	**Processes are concurrent if they are time dependent.**	
27.	**Starvation is a technique of improving the priority of process waiting in Queue for CPU allocation.**	
28.	**Macro Virus creates copies during replication that are functionally equivalent but have distinctly different bit patterns.**	
29.	**In execution phase, the virus places an identical copy of itself into other programs or into certain system area on the disk.**	
30.	**The DES function has four components.**	

Q2	**Choose the correct answer.** **(40 Marks)** **Use only A, B, C, and D to represent your correct choice.**	**Answer**
1.	The set of positive integers is: **A. infinite B. finite C. empty D. subset**	
2.	The expression (* (+ 2 2) (/ (* (+ 3 5) (/ 30 10)) 2)) is evaluated to: **A. 12 B. 96 C. 24 D. 48**	
3.	In C++, a compound assignment operator is: **A. += B. == C. ! = D. all of them**	
4.	In C++, Which of the following is a logical operator: **A.** ! **B.** && **C.** || **D. all of them**	
5.	Any recursive subprogram has: **A. longer time to execute than traditional method. B. less space than iteration case.** **C. more statements than traditional method. D. all of them**	
6.	Circular queue is used instead of queue to: **A. reduce time of search. B. search from any location.** **C. reduce the wasted of storage. D. reduce the area of storage.**	
7.	In evaluating suffix expressions: **A. all operators have higher precedence than operands.** **B. And operation has same precedence as ' + ' and ' - '.** **C. all arithmetic operations are applied before relational operations.** **D. all of them**	
8.	The underflow in queue occurs when: **A. front equal to rear B. rear equal zero C. Front equals zero D. none of the them**	
9.	Which of the following members of a class are accessible only from within member functions of the same class? **A. all members B. public members C. private members D. none of them**	
10.	In C++, Constructors are executed only when: **A. they are called B. objects are declared C. class declared D. none of the them**	
11.	In C++, Objects are variables of type: **A. array B. class C. any user defined data type D. none of them**	
12.	Which of the following members of a class are accessible by objects of that class? **A. public B. private C. protected D. all of them**	

13.	Rotation clockwise 180^0 around z-axis is: **A. reflection around $x = 0; y = 0$** **B. reflection around $x = 0; z = 0$** **C. reflection around $z = 0$** **D. non of them**	
14.	Which image embodies an infinite number of details? **A. bitmap** **B. 8-bit** **C. 24-bit** **D. real world**	
15.	A 3D point $(x = 2, y = 3, z = 1)$ is reflected around point $(x_0 = 1, y_0 = 3, z_0 = 2)$ to get: **A. $(1, 2, 1)$** **B. $(0, 3, 1)$** **C. $(1, 3, 1)$** **D. $(0, 2, 1)$**	
16.	If a 2D point $(x = 2, y = 2)$ is passed through scaling $(S_x = 3, S_y = 2)$ around the point $(x_0 = 3, y_0 = 4)$, the new coordinates will be: **A. $(0, 0)$** **B. $(1, 1)$** **C. $(2, 0)$** **D. non of them**	
17.	If a 2D point $(x = 2, y = 4)$ is reflected around point $(x_0 = 2, y_0 = 1)$ and then shifted by $(T_x = 5, T_y = 7)$, the new coordinates will be: **A. $(7, 1)$** **B. $(1, 2)$** **C. $(7, 2)$** **D. non of them**	
18.	A legal expression in SQL is: **A. Select null from employee;** **B. Select name from employee;** **C. Select name from employee where salary = NULL;** **D. None of them**	
19.	The full form of DDL is: **A. Dynamic Data Language** **B. Detailed Data Language** **C. Data Definition Language** **D. Data Derivation Language**	
20.	Report generator used to: **A. update files** **B. hard-print files** **C. data entry** **D. delete files**	
21.	The ability of each party in a transaction to ascertain the identity of the other party best describes: **A. encryption** **B. authentication** **C. digital signature** **D. message integrity.**	
22.	Which of the following floods a network server or Web server with requests for information or other data in order to crash the network? **A. a denial of service attack** **B. a Trojan horse** **C. Form** **D. a logic bomb**	
23.	Informed search in AI is: **A. Depth first search** **B. Breadth first search** **C. Best first search** **D. all of them**	
24.	TSP with n cities has search space size equals: **A. n^2** **B. 2^n** **C. $2n$** **D. $n!$**	
25.	Designing a network to support only 200 users, needs subnet mask: **A. 255.255.0.0** **B. 255.255.255.0** **C. 255.255.255.200** **D. 255.224.0.0**	

26.	Connecting a Hub and a Switch or two Switches needs Ethernet cable of type: **A. rollover cable B. crossover cable C. straight cable D. optical cable**	
27.	1-5 IPV4 address is: **A. 8 bit B. 16 bit C. 32 bit D. 64 bit**	
28.	Bridge in networks is used to: **A. separate LANs B. connect LANs C. control network speed D. improve network speed**	
29.	Interval between submission time and job completion is: **A. waiting time B. turnaround time C. throughput D. response time**	
30.	The CPU is allocated to the process with least CPU-burst time in: **A. priority scheduling B. shortest job first scheduling C. round robin scheduling D. first come first serve**	
31.	Not a fundamental process state is: **A. ready B. terminated C. cooperated D. waited**	
32.	A condition that leads to a deadlock is: **A. mutual exclusion B. hold & wait C. no pre-emption D. all of them**	
33.	OS enables cooperating processes to communicate with each other via: **A. IPC B. FCFS C. SJF D. none of them**	
34.	Hill-climbing search algorithm may stuck at: **A. local optimum B. global optimum C. near optimum D. none of them**	
35.	Degree of a vertex in a graph is number of: **A. incident edges to it B. number of neighbor vertex to it C. number of connected vertex to it D. all of them**	
36.	Network topology can be: **A. mesh B. hybrid C. bus D. all of them**	
37.	IPv4 address is at: **A. transport layer B. network layer C. data link layer D. physical layer**	
38.	Fiber cables have : **A. single mode B. multi-mode C. no interference D. all of them**	
39.	At which layer, Telnet protocol operates? **A. application B. transport C. network D. physical**	
40.	Which class of IP address is multicast? **A. class A B. class B C. class C D. class D**	

Q3. Answer each of the following (30 Marks)

1. **Consider a system consisting of two processes, P_j and P_i, each accessing two semaphores, S and Q set to the value 1: What is the output if the processes executed concurrently?**

P_j	P_i	Output
wait(S);	wait(Q);	
wait(Q);		
printf("hhhh");	printf("ffff")	
signal(S)		
signal(Q)	signal(Q)	

2. **What is the output of the following program?**

Program	Output

#include <iostream>
using namespace std;
void tryMe(int& v);
int main()
{
int x = 8;
for (int count = 1; count < 5; count++)
tryMe(x);
return 0;
}
void tryMe(int& v)
{
static int num = 2;
if (v % 2 == 0)
{
num++; v = v + 3;
}
else
{
num--; v = v + 5;
}
cout << v << ", " << num << endl;
}	

The following program contains errors. Correct them so that the output will be w = 21.

Incorrect	Correct

**#include <iostream>
using namespace std;
const int SECRET = 5
main ()
{
int x, y, w, z = 9;
if z > 10
x = 12; y = 5; w = x + y + SECRET;
else
x = 12; y = 4; w = x + y + SECRET;
cout << "w = " << w << endl;
return 0;
}**	

3. **Write a program code to compute the following *n*-terms series: 1 + 1 + 2 + 3 + 5 + 8 + 13 + ⋯**

4. **Write a program code to check if a number is prime or not.**