

G.C.E. (A/L) Examination – June 2018
Conducted by Field Work Center, Thondaimanaru.
In Collaboration with Northern Provincial Education
Department
Information & Communication Technology (ICT)



Grade 13 (A/L) 2018

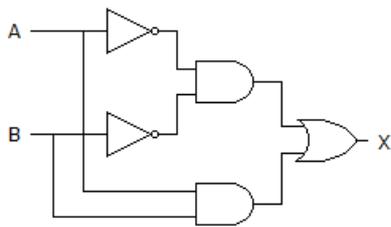
Part - I

Time : 2 hours

Answer all the questions

1. $13.6875_{10} =$
(1) 11.1011_2 (2) 1000.1100_2 (3) 1001.1011_2 (4) 110.1111_2 (5) 1101.1011_2
2. What is the simplified result of the Boolean expression $f(x, y) = (x + \bar{y})(\bar{x} + \bar{y})$?
(1) xy (2) 0 (3) \bar{x} (4) \bar{y} (5) 1
3. Who is credited with the idea of using punch cards to control patterns in a weaving machine?
(1) Blaise Pascal
(2) Herman Hollerith
(3) Charles Babbage
(4) Joseph Jacquard
(5) John Von Neumann
4. Which of the following is considered as the fastest bus in computer?
(1) PCI bus (2) VGA bus (3) CPU bus
(4) Input bus (5) Output bus
5. Which of the following statements is not true with regard to routers?
(1) They select the shortest paths
(2) They select the paths with less congestion
(3) They perform in physical layer
(4) They perform packet switching
(5) They allow data transfer between two computer networks
6. Which of the following is/are correct about database keys?
A – Primary key is a subset of candidate keys
B – Alternate key is a subset of candidate keys
C – Primary key is a subset of alternate keys
(1) A only (2) B only (3) C only (4) A, B only (5) B, C only
7. Which of the following is/are correct about computer programming languages?
A – Python is a low level computer programming language
B – Translators are needed for the programs written in a high level programming language to execute in computer
C – The second generation computer programming language is also called assembly language
(1) A only (2) B only (3) A,B only (4) A,C only (5) B, C only
8. Two's complement form of $(-17)_{10}$ is.
(1) 10101111_2 (2) 10001111_2 (3) 11101111_2 (4) 00010001_2 (5) 11101110_2

9. What is the output X of the logic circuit given below?



- (1) $AC + B$ (2) $A + BC$ (3) $AB + C$ (4) $A\bar{B} + C$ (5) $\bar{B} + AC$

10. Consider the following relation in a relational database.

Faculty (Facid, Fname, Office, Phone)

Consider the following functional dependencies.

Facid \rightarrow Fname, Office, Phone

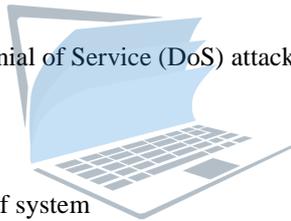
Office \rightarrow Phone

Which of the following is correct about Faculty?

- (1) It is in zero normal form (2) It is in first normal form
 (3) It is in second normal form (4) It is in third normal form
 (5) It cannot be determined normal form

11. What is the most common sign of a Denial of Service (DoS) attack?

- (1) Stealing of data from system
 (2) Slow performance
 (3) Rebooting of system
 (4) Sudden increment in performance of system
 (5) Increasing speed of system



12. Which of the following is a valid BCD (Binary Coded Decimal) code?

- (1) 1111₂ (2) 1100₂ (3) 1011₂ (4) 1000₂ (5) 1101₂

13. $AB_{16} =$

- (1) 523₈ (2) 532₈ (3) 253₈ (4) 235₈ (5) 325₈

14. What is the output of the Python statement print (7//2)?

- (1) 3.5 (2) 14 (3) 9 (4) 3 (5) 4

15. Which of the following is a correct statement regarding Python user defined function?

A – def calc(): is an example for that

B – It will be executed only if calling

C – A function may be called only once

Which of the above is/are correct?

- (1) A only (2) B only (3) C only (4) A, B only (5) A,B,C all

16. What is the output of the following Python program?

```
a=[3,7,6,1,2,4,5][1:4:2]
```

```
print(a)
```

- (1) [7,1] (2) [7,6,1,2,4] (3) [1,4,2] (4) [7,1,4] (5) [7]

17. Which of the following is correct regarding Python programming?
 A – A list is a mutable data type
 B – A dictionary is an immutable data type
 C – A tuple is a mutable data type
 Which of the above is/are incorrect?
 (1) A only (2) B only (3) C only (4) A, C only (5) A,B,C all
18. The network layer of OSI network reference mode is related to.
 (1) bits (2) frames (3) packets (4) bytes (5) megabytes
19. Which of the following SQL command is a type of DML(data manipulation language)?
 (1) drop (2) grant (3) update (4) create (5) alter
20. Which of the following is a valid SQL statement to remove data table employee?
 (1) remove table employee (2) delete table employee (3) drop employee table
 (4) drop table employee (5) delete employee table
21. To achieve reliable transport in TCP, is used to check the safe and sound arrival of data.
 (1) Packet
 (2) Buffer
 (3) Segment
 (4) Acknowledgment
 (5) Quality
22. Consider the following statements.
 A – Sharing of the Internet connection among multiple users
 B – Caching of web pages obtained from web servers
 C – Mapping of private IP addresses into public IP addresses
 Which of the above is/are the activity/activities of proxy server?
 (1) A only (2) B only (3) C only (4) A, C only (5) A,B,C all
23. Which of the following protocol is responsible for downloading of a file in the Internet?
 (1) FTP (2) POP (3) SMTP (4) HTTP (5) IP
24. Which of the following Python program is syntactically correct?
 (1) (2) (3)

```
def see(a,b):
    if a>b
        print(a)
    else
        print(b)
see(3,4)
```

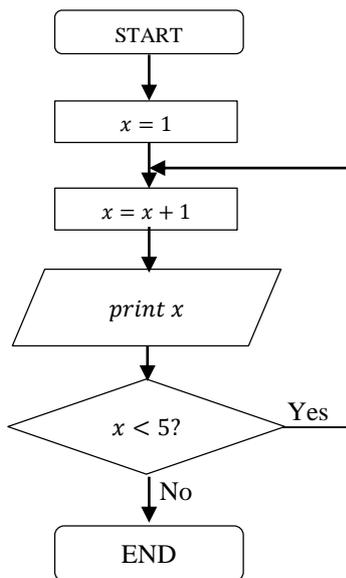
```
def see(a,b):
    if a>b:
        print(a)
    else:
        print(b)
see(3,4)
```

```
def see(a,b)
    if a>b:
        print(a)
    else:
        print(b)
see(3,4)
```



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25. Which of the following Python program consists of the result of the flowchart given below?



- | | | |
|---|---|--|
| <p>(1)
 <code>x = 1</code>
 <code>while (x < 5):</code>
 <code> x = x + 1</code>
 <code> print(x, end = ' ')</code></p> <p>(4)
 <code>x = 1</code>
 <code>while (x < 5):</code>
 <code> x = x + 1</code>
 <code> print(x, end = ' ')</code></p> | <p>(2)
 <code>x = 1</code>
 <code>while (x > 5):</code>
 <code> x = x + 1</code>
 <code> print(x, end = ' ')</code></p> <p>(5)
 <code>x = 0</code>
 <code>while (x < 5):</code>
 <code> x = x + 1</code>
 <code> print(x, end = ' ')</code></p> | <p>(3)
 <code>x = 1</code>
 <code>while (x > 5):</code>
 <code> x = x + 1</code>
 <code> print(x, end = ' ')</code></p> |
|---|---|--|

26. Which of the following is correct about comments used in Python program?

- (1) It always should be written first
- (2) It always should be written last
- (3) It should be written only once
- (4) The @ sign is used to write it
- (5) It describes about programs



27. Consider the following characteristics.

- A – Autonomy
- B – Pro-activeness
- C – Reactivity
- D – Social ability

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Which of the above is/are the characteristic(s) of a software agent?

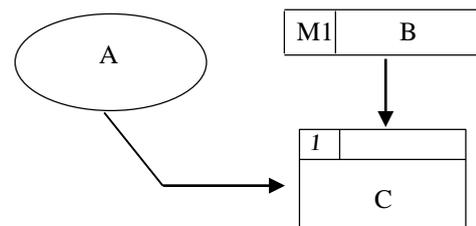
- (1) A only (2) B only (3) B,C only (4) A,B,C only (5) A,B,C,D all

28. What subnet mask is needed if an IPv4 network has 40 devices that need IP addresses and address space is not to be wasted?

- (1) 255.255.255.0 (2) 255.255.255.128 (3) 255.255.255.192
 (4) 255.255.255.224 (5) 255.255.255.240

29. A, B and C are respectively represented in the following data flow diagram (DFD) using of SSADM.

- (1) Data store, external entity, process
- (2) External entity, process, data store
- (3) External entity, data store, process
- (4) Process, external entity, data store
- (5) Data store, process, external entity



30. Consider the following statements.

A – DRAM consists of refresh

B – Density of SRAM is higher than that of DRAM

C – Register is made of DRAM

Which of the above is/are correct?

- (1) A only (2) B only (3) C only (4) A,B only (5) A,B,C all

31. Which of the following is not a function of an operating system?

- (1) Scheduling processes
- (2) Managing memory
- (3) File management
- (4) Creating processes
- (5) Removing viruses

32. Consider the following result rendered by web browser.



Which of the following HTML code segment is appropriate to create this display?

- (1) `<form name="cars" size="3">`
 `<option value="volvo"> Volvo </option>`
 `<option value="saab"> Saab </option>`
 `<option value="fiat"> Fiat </option>`
`</form>`
- (2) `<select name="cars" size="3">`
 `<option value="volvo"> Volvo </option>`
 `<option value="saab"> Saab </option>`
 `<option value="fiat"> Fiat </option>`
`</select>`
- (3) `<select name="cars" size="3">`
 `<value="volvo"> Volvo </value>`
 `<value="saab"> Saab </value>`
 `<value="fiat"> Fiat </value>`
`</select>`
- (4) `<select name="cars" size="3">`
 `<option value="volvo"> Volvo </option>`
 `<option value="saab"> Saab </option>`
 `<option value="fiat"> Fiat </option>`
`</select>`
- (5) `<list name="cars" size="3">`
 `<option value="volvo"> Volvo </option>`
 `<option value="saab"> Saab </option>`
 `<option value="fiat"> Fiat </option>`
`</list>`

33. Which of the following statements is/are correct with respect to entity integrity constraint?

A – It specifies that primary key values can be composite

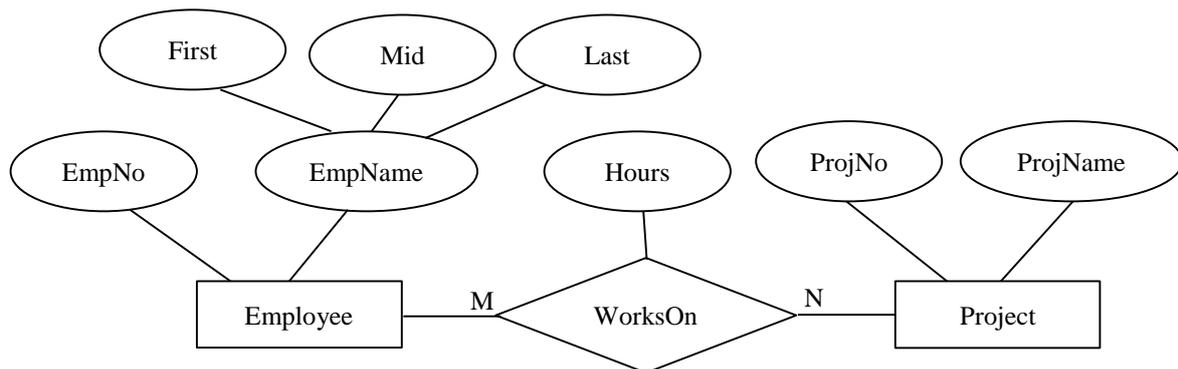
B – It specifies on individual relations

C – It specifies that no primary key value can be null

- (1) A only (2) B only (3) A, B only (4) A, C only (5) B, C only

34. If you wanted to have 12 subnets with a Class C network, which subnet mask would you use?
(1) 255.255.255.252 (2) 255.255.255.255 (3) 255.255.255.240
(4) 255.255.255.248 (5) 255.255.255.249
35. Application layer of OSI network reference model consists of.
(1) POP (2) TCP (3) IP (4) UDP (5) PPP
36. Consider the followings.
A – Geographical barriers
B – Seller and buyer are always in a conduct
C – Paying money via online
Which of the above is /are benefits of e-commerce in comparing with traditional commerce?
(1) A only (2) B only (3) A, B only (4) B, C only (5) A, C only
37. Which of the following HTML tag is used to insert a webpage into another webpage?
(1) <p> (2) <iframe> (3) <html> (4) <embed> (5) <body>
38. Which of the following is not considered as system implementation technique?
(1) Phase implementation
(2) Pilot implementation
(3) Testing implementation
(4) Parallel implementation
(5) Direct implementation
39. Which of the following CSS code is correct to display Border?
(1) p {borderstyle: solid;}
(2) p {border: solid;}
(3) p {border-type: solid;}
(4) p {style: solid;}
(5) p {border-style: solid;} 
40. Which of the following CSS code is correct to define font?
(1) p {font: "Times New Roman", Times, serif;}
(2) p {font-type: "Times New Roman", Times, serif;}
(3) p {font-family: "Times New Roman", Times, serif;}
(4) p {font-variety: "Times New Roman", Times, "serif";} 
(5) p {font-face: "Times New Roman", "Times", serif;} 
41. “..... holds the address of the next instruction to be executed in the program”.
(1) Arithmetic Logic Unit (ALU)
(2) Program Counter (PC)
(3) Control Unit (CU)
(4) L1 cache memory
(5) Main memory

42. What is the top level domain (TLD) in the following URL?
 http://www.doenets.lk/al/ict/index.html
 (1) www (2) index.html (3) http (4) doenets.lk (5) lk
43. In computer security, means that computer system assets can be modified only by authorized parties.
 (1) Confidentiality (2) Integrity (3) Availability
 (4) Authenticity (5) Non-repudiation
44. A network administrator might want to create subnets a network. Which one is the reason for that?
 (1) Simplifies network design
 (2) Improves network performance
 (3) Reduction in number of routers needed
 (4) Reduction in number of switches needed
 (5) Reduction of cost
45. Which of the following task is related to the memory management of an operating system?
 (1) Creating and deleting processes
 (2) Scheduling processes in CPU
 (3) Suspending and resuming processes
 (4) Proving a mechanism for communication between processes
 (5) Allocating memory for processes
46. Which of the following combinations cannot be used into Karnaugh map in grouping of cells?
 (1) Corners in the same row
 (2) Corners in the same column
 (3) Diagonal corners
 (4) Overlapping combinations
 (5) Wraparound
47. Consider the following ER diagram illustrating the relationship between employees and projects.



Consider the following relations.

A - Employee (EmpNo, First, Mid, Last)

B - Employee (EmpNo, Name)

C - Project (ProjNo, ProjName)

D - Works_On (EmpNo, ProjNo, Hours)

If this ER diagram is mapped into relations, what will relations be obtained?

- (1) A only (2) A,B only (3) A,B only (4) A,C,D only (5) A,B,C only

48. Consider the following part of the database to keep track of students and their marks for the courses that they follow.

Student (sid, sname, year)

Register (sid, cid, mark, grade)

Course (cid, cname, no_credit, deptid)

Which of the following SQL would list the student id (sid) and student name (sname) of each student along with the course id (cid) and name of the courses (cname) for which the student has registered?

- (1) select sid, sname, cid, cname from Student S, Register R, Course C where S.sid=R.sid and R.cid=C.cid
- (2) select S.sid, sname, C.cid, cname from Student S, Register R, Course C where S.sid=R.sid and R.cid=C.cid
- (3) select S.sid, sname, C.cid, cname from Student S, Register R, Course C where S.sid=R.sid
- (4) select S.sid, sname, C.cid, cname from Student S, Register R, Course C where R.cid=C.cid
- (5) select S.sid, sname, C.cid, cname from Student S, Register R, Course C where S.sid=R.sid , R.cid=C.cid

Consider the following Python program to answer questions 49 and 50.

```
a = [51,12,37,4,15,61]
b = a[0]
for k in range(1,6):
    if b > a[k]:
        b=a[k]
print(b)
```



49. What is the output of this Python program?

- (1) 51 (2) 4 (3) 12 (4) 61 (5) 15

50. What will be the output if the Python statement if b > a[k]: is changed to if b < a[k]: ?

- (1) 51 (2) 4 (3) 12 (4) 61 (5) 15



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Part – II A

Time : 3 hours

Structured questions

Answer for all the questions

1.

(a) Write down two functions of a shopping cart in an e-commerce website.

.....

.....

.....

.....

(b) Consider the following rule for data encryption algorithm.

Message	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Encrypted message	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B

Based on this algorithm, write down the encrypted message obtained for the message “HIJACKING”.

.....

(c) In computer system, write down two reasons for requiring interrupt.

.....

.....

2.

(a) Write down the following CSS rules whether they are correct or incorrect. If they are incorrect, mention and rewrite.

(i) `body { background-color:red;}`

(ii) `p,h1 { text-align:right;}`

(iii) `div {font:"comic sans ms"}`

(b) The table shown below stores details of students and the overall grade each student obtained in different subjects. The Primary Key is (StudentID, SubjectID).

Result

<u>StudentID</u>	StudentName	<u>SubjectID</u>	SubjectName	Grade
S001	Smith	M01	Java	A
S001	Smith	M02	Database	B
S002	Ford	M01	Java	B

(i) Which normal form does the above table violate and why?

.....

.....

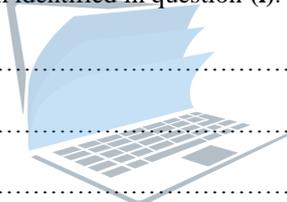
.....

(ii) Convert the table into the normal form identified in question (i).

.....

.....

.....



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3.

(a) In an operating system, what will happen while suspending a process?

.....

.....

.....

(b) In an operating system, what is meant by CPU scheduling?

.....

.....

.....

(c) Briefly explain the result of the following HTML code segment.

```
<iframe src="sample.html" height="200" width="300"> </iframe>
```

.....
.....
.....

4.

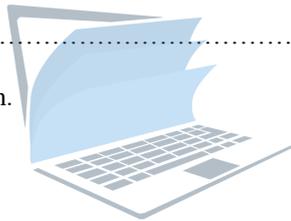
(a) Write down SQL statement to create the table Order. In Person table, PersonID is a primary key. PersonID is a foreign key in Order table.

Order (OrderID, OrderNumber, PersonID)
Person (PersonID, PersonName)

.....
.....
.....
.....
.....

(b) Consider the following Python program.

```
s=1
n=1
while n<=10:
    print(s,end= ' ')
    s=s*2
    n=n+1
```



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(i) Write down the output of this program.

.....
.....

(ii) How do you modify the program given in above (i) in order to obtain odd numbers as output in the given range? (you are not allowed to add additional lines).



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Part – II B

Essay questions

Write down answer for any four questions only

01.

A house heating system works using of a thermostat. Heating system can be manually switched on or off. Further, it works when the room temperature is lower than required. It stops work when the room temperature is higher than required. It works when the external temperature is near freezing that may cause damage heat tubes.

The system is activated based on the following conditions.

When the heating system is switched on and when the room temperature is lower than required or when the external temperature is near freezing and when the room temperature is lower than required.

Answer the following questions by defining Boolean values for inputs and outputs.

- (a) Construct truth table for this system.
- (b) Write down Boolean expression by using truth table or any way.
- (c) Simplify the Boolean expression obtained in (b) above [show all the workings and Boolean algebraic Laws].
- (d) Draw a logic circuit for the Boolean expression obtained in (c) above.

02.

Draw a level 1 dataflow diagram (Level 1 DFD) for the following scenario using of SSADM symbols including appropriate processes, data stores, data flows and external entities.

Students apply to their library for membership. These details are kept in a member file. Each member is able to borrow up to three books over a period of four weeks. These details are kept in a loan file. A fine is raised for book is overdue. These details are kept in a fine file. The library may hold more than one copy of a book. The value of the fine varies according to the number of weeks overdue. Books can be reserved; these are kept for a week. These details are kept in a reservation file.

03.

DailyWay is super market with hundreds branches island wide. They sell various goods for customers demand. Now they sell goods through their branches in traditional commerce system. Large crowd of customers are served daily though these branches. Hundreds of employees are working there and the stock control system is computerized.

- (a) DailyWay decided to sell goods for customers via their website. What is the suitable e-commerce type for this? Justify your answer.
- (b) A customer order for goods from his/her home to website. What type of e-commerce is? Give reason.
- (c) It is planning to link all the branches to virtual private network (VPN) of this organization without directly connecting to the Internet. State one reason for this.
- (d) DailyWay decided to use software agent for their stock control system in order to provide better customer service and effectively using of their employees. Briefly explain three reasons for this decision of DailyWay.

04.

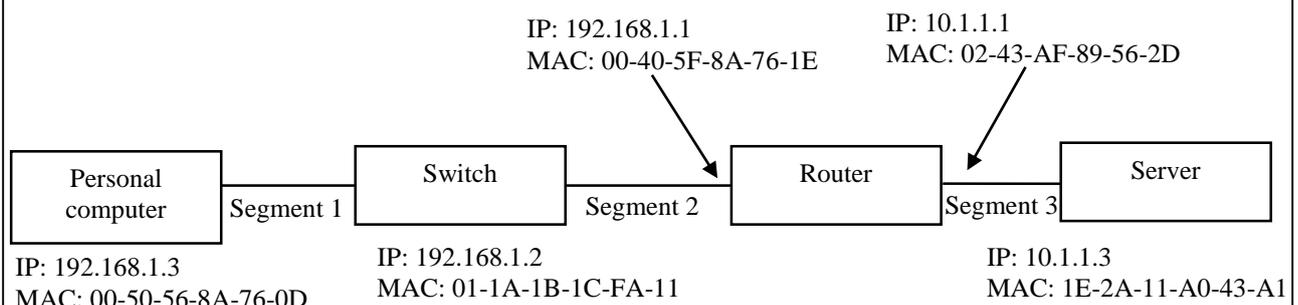
- (a) Compare and contrast with two factors each of first and second generation programming languages.
- (b) A company which provides parcels delivery services through postal service is to be calculated total charge for parcels according to the charge for different range of parcels weight given below in the table. Total charge as output is to be calculated by obtaining parcels weight from user. One weight should be entered at a time and calculations should be done for a number of weights. Its number should be obtained first. Draw flowchart for this scenario.

Range of parcels weight	From 1 to 5 kilo gram	From 6 to 10 kilo gram	More than 10 kilo gram
Charge	Fixed rate: 100/=	50/= per kilo gram	70/= per kilo gram

- (c) Write down full Python program using of flowchart.

05.

- (a) Write down three main functions performed by a protocol operating at the network layer of OSI network reference model.
- (b) The following figure shows a small scale network comprising one switch and one router. A personal computer is connected to the switch and a server is connected to the router. In the figure, corresponding IP addresses and MAC addresses are given for the devices.



For this network, consider data being sent from the personal computer to the server and indicate the values of the source and destination MAC addresses for the frame and the IP addresses for each segment.

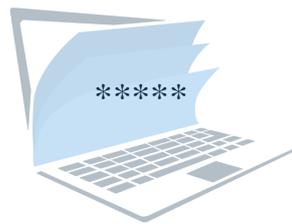
(c) Write down three differences in the quality of service (QoS) offered to applications by the TCP and UDP protocols.

06.

Scenario of a book stock management system is given below.

Books are written by authors and published by the publishers. A book may be written by one or more authors and an author may write one or more books. Author is uniquely identified by author name and it also contains address and email address. Book is uniquely identified by ISBN. It also consists of year, title, and price. A publisher publishes many books every year. A shopping basket contains a lot of books. Warehouse stocks a lot of books. Customer takes book from shopping basket. Shopping basket is uniquely identified by basketID.

Construct ER diagram for book stock management system and state all the assumptions if you made.



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