

Name: _____ / _____
(Last name) (First name)

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Solutions

York University

Lassonde School of Engineering

Electrical Engineering & Computer Science

EECS 1520.03 – COMPUTER USE: Fundamentals

Test 2 Version alt

Instructions:

1. This is an in-class examination, therefore examination rules are in effect.
2. Fill in the box at the top of this page with your name and Student Number.
3. Answer ALL questions in the space provided.
4. Time allowed is **50** minutes.
5. Use of calculation or communication devices of any type is **NOT** allowed.
6. There are **7** pages of questions **in addition** to this cover.
Please count them.

<u>Part</u>	<u>Value</u>	<u>Mark</u>
A	10	_____
B	5	_____
C	9	_____
D	10	_____
E	16	_____

Totals: **50**

Part A [10 points]

1. Choose the term from the list that matches each description.

Terms

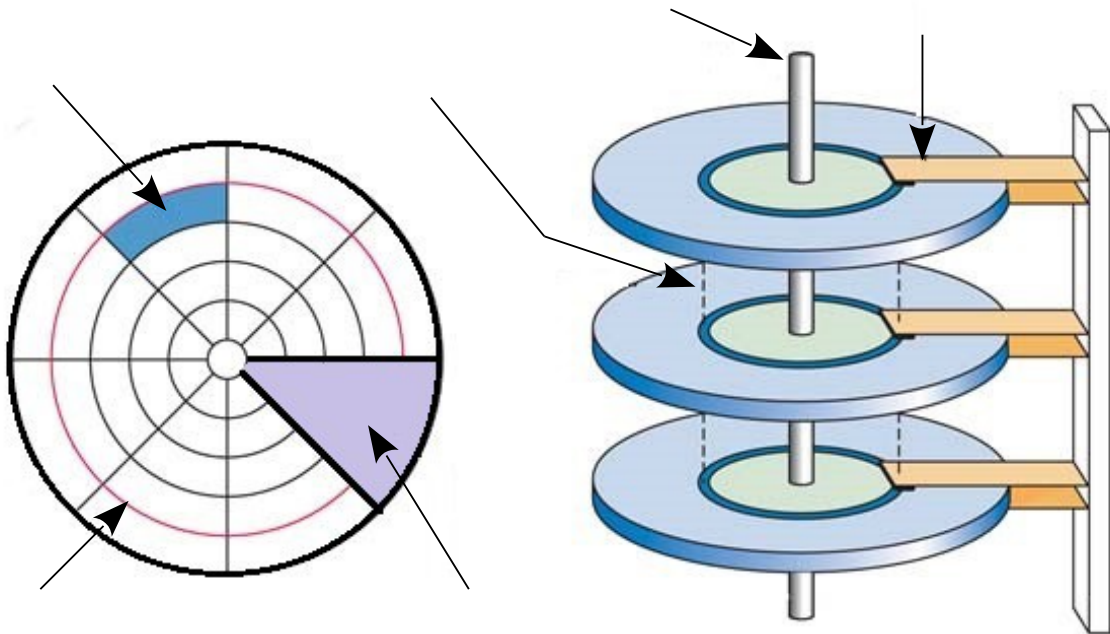
Access Time
 Arithmetic/Logic Unit
 Block
 Control Unit
 Cylinder
 Instruction Register
 Memory
 Program Counter
 Sector
 Spindle
 Transfer Rate

Addressability
 Arm
 Bus Width
 CPU
 Input
 Latency
 Output
 Registers
 Seek Time
 Track

Descriptions

1) Computer component that controls the rest	e - Control Unit
2) Number of bits stored in each memory location	b - Addressability
3) Memory locations within the CPU	j - Registers
4) Time required to locate the required track on a disk	k - Seek Time

2. Label each arrow with a term from the list to identify the component to which it points.[6] [See Part A1 Solution for the labels.](#)



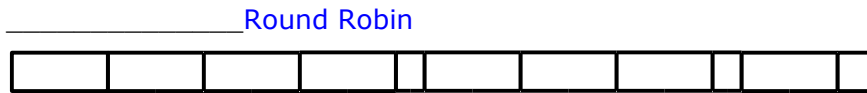
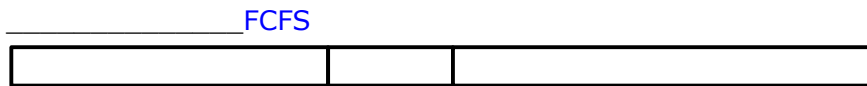
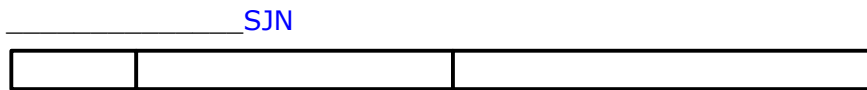
Part B [5 points]

The table at the bottom of the page lists 3 processes in the *Ready state*, along with their **Service Times**.

The charts represent the scheduling of the processes under 3 techniques:

- **FCFS** - First Come First Served
- **RR** - Round Robin
- **SJN** - Shortest Job Next

1) Identify each of the charts by the scheduling technique it represents. [2]



2) Now use the charts to calculate the Turnaround Time for each technique. [3]

Process	Service Time	Turnaround Times		
		FCFS	SJN	Round Robin
p1	33	33	46	76
p2	13	46	13	43
p3	44	90	90	90
		1	1	1

N.B. When required, use a quantum of 20 units.

Part C [9 points]

The following schemas describe relations in the sample database in CS:I.

- A) Movie (MovieId:key, Title, Genre, Rating)
- B) Customer (CustomerId:key, Name, Address, CreditCardNumber)
- C) Rents (CustomerId, MovieId, DateRented, DateDue)
- D) NEW \leftarrow SELECT from MOVIE where RATING = "PG"
- E) PGmovies \leftarrow PROJECT MovieId, Title from NEW
- F) TEMP1 \leftarrow JOIN CUSTOMER and RENTS
where CUSTOMER.CustomerId = RENTS.CustomerId
- G) RENTALS \leftarrow PROJECT Name, Address, MovieId from TEMP1
- H) TEMP2 \leftarrow JOIN RENTALS and PGmovies
where RENTALS.MovieId = PGmovies.MovieId
- I) PGrenters \leftarrow PROJECT Name, Address, Title from TEMP2

For each relation below, select its schema from the list above.

_____A			
MovieId	Title	Genre	Rating
101	Sixth Sense, The	thriller, horror	PG-13
102	Back to the Future	comedy adventure	PG
1033	Monsters, Inc.	animation, comedy	G
104	Field of Dreams	fantasy drama	PG
105	Alien	sci-fi horror	
107	X-Men	action, sci-fi	PG-13
...			
7442	Platoon	action drama war	R

_____I		
Name	Address	Title
Dennis Cook	789 Main	Back to the Future
Dennis Cook	789 Main	Field of Dreams
Randy Wolf	12 Elm	Field of Dreams
Randy Wolf	12 Elm	Back to the Future

_____ E	
MovieId	Title
102	Back to the Future
104	Field of Dreams

Select one of the following terms to complete each of the following statements.

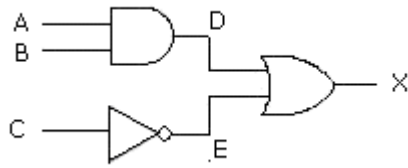
A) attribute	B) cardinality constraint
C) database	D) database engine
E) database management system	F) database model
G) Entity-relationship modelling	H) ER diagram
I) Join	J) key
K) physical database	L) Project
M) query	N) relation
O) relational model	P) schema
Q) Select	R) SQL
S) subschema	T) tuple

Place the appropriate **LETTER** in the blank.

- 1) A table is also called a(n) _____. N
- 2) _____ is a database operation to extract tuples from a relation. Q
- 3) A request to retrieve data from a database is a(n) _____. M
- 4) _____ is a description of the entire database structure used by the database software to maintain the database. P
- 5) _____ is a collection of files that contain the data. K
- 6) A(n) _____ is one or more fields of a record that uniquely identifies it. J

Part D [10 points]

Refer to the following circuit diagram for all questions in this Part.



1. Complete the Truth Table for this circuit, including Boolean expressions for D, E, and X. [5]

A	B	C	D = A • B or AB	E = C'	X = D + E
0	0	0	0	1	1
0	0	1	0	0	0
0	1	0	0	1	1
0	1	1	0	0	0
1	0	0	0	1	1
1	0	1	0	0	0
1	1	0	1	1	1
1	1	1	1	0	1

- 1 point for columns A,B,C
- 1 point for correct expressions in the titles
- 1 point for each correct column

2. Write a Boolean expression that represents the whole circuit.[2]

$$X = AB + C'$$

3. Show how this circuit can be described in a single Excel formula.[3]

$$= \text{OR}(\text{AND}(A, B), \text{NOT}(C))$$

- 1 for OR(,)
- 1 for AND(A ,B)
- 1 for NOT(C)

Part E [16 points]

The tables below are PARTIAL views of a book of worksheets.

All ranges are named using the labels above them, which are **bold**. Labels are NOT included in the ranges they name. Names for additional ranges are indicated by Comment balloons.

CompositionsTable

Sequenceld	ComposerId	Composition	Type	Instrument	Key
1	1	Giselle	Ballet	Orchestra	
2	2	Iberia	Suite	Orchestra	
3	3	Brandenburg Conc. 6	Concerto	Orchestra	
4	3	Violin Concerto	Concerto	Violin	E Major
5	3	Violin Concerto	Concerto	Violin	A Minor
6	3	Brandenburg Conc. 2	Concerto	Orchestra	
7	3	Mass in B Minor	Choral		B Minor
8	3	Brandenburg Conc. 4	Concerto	Orchestra	
9	3	St. Matthew Passion	Choral		
10	3	Brandenburg Conc. 3	Concerto	Orchestra	
11	3	Brandenburg Conc. 1	Concerto	Orchestra	
12	3	Brandenburg Conc. 5	Concerto	Orchestra	
13	4	Violin Concerto	Concerto	Violin	
14	4	Piano Concerto 1	Concerto	Piano	
15	4	Piano Concerto 2	Concerto	Piano	G
16	4	Piano Concerto 3	Concerto	Piano	E
17	5	Symphony 4	Symphony	Orchestra	B Flat
18	5	Piano Concerto 4	Concerto	Piano	G Major
19	5	Piano Concerto 5	Concerto	Piano	E Flat Maj
20	5	Symphony 6	Symphony	Orchestra	F
21	5	Symphony 3	Symphony	Orchestra	E Flat
22	5	Symphony 5	Symphony	Orchestra	C Minor
23	5	Symphony 7	Symphony	Orchestra	A
24	5	Symphony 8	Symphony	Orchestra	F
25	5	Piano Concerto 1	Concerto	Piano	C
26	5	Sonata 23	Sonata	Piano	F Minor
27	5	Piano Concerto 3	Concerto	Piano	C Minor
28	5	Sonata 21	Sonata	Piano	C
29	5	Violin Concerto	Concerto	Violin	D

CompositionLabels

ComposersTable

Id	Composers	Initial	YOB	YODCountry
1	Adam	A.	1803	1856 France
2	Albeniz	I.	1860	1909 Spain
3	Bach	J.S.	1685	1750 Germany
4	Bartok	B.	1881	1945 Hungary
5	Beethoven	L. van	1770	1827 Germany
6	Berlioz	H.	1803	1869 France
7	Brahms	J.	1833	1897 Germany
8	Britten	B.	1913	1976 England
9	Bruch	M.	1838	1920 Germany
10	Chopin	F.	1810	1849 Poland

Search

Composer	Composer_ID	Number_of_Works
<input type="text"/>		

WorksLabels

Work#	Composition	Type	Instrument	Key
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When the user enters a composer's name on the **Search** page formulas produce the rest of the content.

Search

Composer	Composer_ID	Number_of_Works
Bach	3	10

Work#	Composition	Type	Instrument	Key
1	Brandenburg Conc. 6	Concerto	Orchestra	
2	Violin Concerto	Concerto	Violin	E Major
3	Violin Concerto	Concerto	Violin	A Minor
4	Brandenburg Conc. 2	Concerto	Orchestra	
5	Mass in B Minor	Choral		B Minor
6	Brandenburg Conc. 4	Concerto	Orchestra	
7	St. Matthew Passion	Choral		
8	Brandenburg Conc. 3	Concerto	Orchestra	
9	Brandenburg Conc. 1	Concerto	Orchestra	
10	Brandenburg Conc. 5	Concerto	Orchestra	

Write a formula for **Composer_ID**. [4]
 =LOOKUP(Composer, Composers, Id)

Write a formula for **Number_of_Works**. [3]
 =COUNTIF(ComposerId, Composer_ID)

The **Works#** column uses a set of Recurrence formulas that only display results when it is appropriate, that is, when there is a value in **Number_of_Works**.

Write the initialising formula (in A5). [5]
 =IF(ISNUMBER(Number_of_Works), 1, "")

All other content is provided by a single, but complex, formula. Most of it is shown below. Add the missing component. [4]

(*Hint: It calculates the column number for the INDEX function.*)

=INDEX(CompositionsTable, MATCH(Composer_ID, ComposerId) – Number_of_Works + Works, MATCH(WorksLabels, CompositionLabels, 0))