CMPSCI 105 Final Exam Spring 2016 May 5, 2016 Professor William T. Verts Solution Key

GENERAL KNOWLEDGE, SPECIAL TOPICS, & REVIEW

<1> 10 Points – One point each question. Answer *any ten*. Answer more for extra credit. Blank or incorrect answers will be ignored.

F	True or False: A 3 ¹ / ₂ -inch diskette is a "hard disk".
F	True or False: A USB flash drive is a "hard disk".
3	How many bits will be in each packet when converting binary to octal?
3.70043	What is the base 2 logarithm of 13?
32768	How many bits are there in four Kilobytes?
F	True or False: 3D adds information to a chart or graph produced in Excel.
Line	Which chart type is best for showing trends over time?
Pie	Which chart type is best for showing proportions of a whole?
Stack Bar	Which chart type shows a total for corresponding points from several series?
Т	True or False: A legend is needed when a chart shows multiple series.
F	True or False: Linear Search is faster than Binary Search.
Т	True or False: In order to perform a Binary Search, the list must be sorted.
42536	In Excel, May 5, 2016 has value 42495. What then is June 15, 2016?
0.75	What is the internal time fraction returned by =TIME (18,0,0) ?
NO	Yes or No: Can the value returned by the Excel formula =1/10 be represented
NU	perfectly as a double-precision float, with no round-off error?

<2> 5 Points Extra Credit – After two of the quizzes I wrote a "magic number" on screen. What are those magic numbers? (3 points for one, 5 points for both.)

$2^{16} = 65536, 2^{24} = 16777216$

<3> 5 Points – One quantity represents the number of centimeters per inch {cm/in}, and another contains the number of centimeters per meter {cm/m}. Which of the following expressions gives me the number of meters per inch {m/in}? Circle the correct answer.

{cm/in} × {cm/m} {cm/in} ÷ {cm/m} {cm/m} ÷ {cm/in}

<4> 5 Points – Short Answer – Why are *comma-and-quote-delimited* text files important to both spreadsheets and databases?

They can be imported easily, edited by a text editor, emailed as message body (not attachment). Accept anything reasonable.



<5> 10 Points – Trace the following flowchart and show the final printed result.

-5 for "off by one" errors of any type (like stopping the loop too early or too late), otherwise full credit or no credit, unless there is a common error mode. Use your discretion.

SPREADSHEETS

<6> 12 Points – Write a formula with the VLOOKUP function for cell M11 (using the table in P10:R16) to compute the most expensive food item (Pancakes, Burger, etc.) that Fred can afford. Write it so that when the formula is copied to M12:M19 the food items for all remaining people are correct. Write a second formula for cell N11 (also using the table) to compute the price range (Cheap, Medium, etc.) for Fred. This formula will be copied to cells N12:N19, and also must do the right thing in each cell after the copy.

Your answer for **M11**: =VLOOKUP (<u>L11, \$P\$10:\$R\$16, 2</u>)

Your answer for N11: =VLOOKUP (<u>L11, \$P\$10:\$R\$16, 3</u>)

	J	K	L	М	Ν	0	Р	Q	R	S
9										
10		NAME	BUDGET	FOOD ITEM	PRICE RANGE		0	Nothing	Sorry!	
11		Fred	\$17.00				5	Pancakes	Cheap	
12		Sam	\$8.00				10	Burger	Cheap	
13		Mary	\$23.00				15	Chicken	Medium	
14		Carol	\$16.00				20	Sushi	Medium	
15		Joe	\$7.00				25	Prime Rib	Expensive	
16		Bob	\$27.00				30	Sashimi Deluxe	Expensive	
17		Tom	\$9.00							
18		Bill	\$3.00							
19		Sue	\$15.00							
20										

6 points each: 2 for cell, 3 for range (-1 for no \$), 1 for column

<7> 8 Points – Cell B2 contains the formula =INT (NOW()), where the INT function discards any fraction from its argument. The result is formatted as a date, as shown. Write simple formulae <u>using B2</u> for cells B3 through B6 to compute the values indicated by the corresponding text in column C. (Cells B3:B7 will also be formatted as dates.)

	А	В	С	D
1				
2		Thursday, May 05, 2016	RIGHT NOW	
3		=B2+1	TOMORROW	
4		=B2+2	THE DAY AFTER TOMORROW	
5		=B2+7	EXACTLY ONE WEEK FROM TODAY	
6		=B2-60	THE DATE 60 DAYS AGO	
7				

2 points each. -1 if they use NOW () instead of B2

<8> 5 Points – Cell **\$10** contains: **=Q8+V15*12-\$T\$9+R\$12-X7**, which is then copied to cell **V15**. What is the resulting formula in cell **V15** after the copy has been completed?

One point for: = + *12-\$T\$9+ \$12-

One point per slot:

=<u>T13+Y20</u>*12-\$T\$9+<u>U</u>\$12-<u>AA12</u>

<9> 5 Points – Write a formula to compute the average of four items: cell C5, cell C6, cell C7, and the result of adding cells F1, F2, and F3.

=AVERAGE (C5:C7,SUM(F1:F3))	Expected answer
=AVERAGE (C5,C6,C7,F1+F2+F3)	Allowed answer

-1 per error, but do not go below zero

<10> 10 Points – Here is a spreadsheet that describes a file containing a video file. In each **empty** outlined cell in column **B** *write a formula* to compute the desired quantity listed in column **C**. Do not compute or use actual numbers! We want formulae that refer only to cells!

	А	В	С	D	
1					
2					
3		320	Image Width (Pixels)		
4		240	Image Height (Pixels)		
5		3	Bytes per Pixel (Color)		
6		30	Frames per Second		
7		15	Length of Video (Minutes)		
8		60	Seconds per Minute		
9		=B3*B4	Pixels per Frame		
10		=B9*B5	Bytes per Frame		
11		=B10*B6	Bytes per Seconds		
12		=87*88	Length of Video (Seconds)		
13		=B11*B12	Bytes (Total)		
14					

2 points per formula, -1 per error. Accept any formula that works.

DATABASES

For all database problems on this and the following page use the tables shown here: Day Names and Solar. Table Solar represents the performance of my new roof-top photovoltaic power system, installed in late March, 2016, where the Daily KWH field shows the number of kilowatthours produced by the system on each day. Solar is indexed on the Calendar Day field.

Solar 📃 Day Names 🗐 Ful	ll View 🗗 Filter 🛛 🗙	Solar 🔲 Day Nat	mes 🗗 Full Viev	v Filter	
Day Code 🔸 Day String 🚽		🖊 Calendar Day 👻	Day of Week 👻	Daily KWH 🔸	Weather
SU Sunday		3/29/2016	TU	12	System on at 3:45pm
MO Monday		3/30/2016	WE	66	Sunny
TIL Tuesday		3/31/2016	TH	52	Late clouds
TO Tuesday		4/1/2016	FR	29	Rainy
WE Wednesday		4/2/2016	SA	17	Rainy
TH Thursday		4/3/2016	SU	39	Snow, then sunny
FR Friday		4/4/2016	MO	0	Snow (6 inches)
SA Saturday		4/5/2016	TU	3	Sunny, snow melting
		4/6/2016	WE	15	Sunny early, then overcast
		4/7/2016	TH	15	Rainy
cord: 14 4 6 of 7 🕨 🕨 👫 🥡	K No Filter Search	4/8/2016	FR	32	Sunny early, then overcast
	Num Lock 🛅 🔀 🛃 😹	4/9/2016	SA	54	Sunny early, then overcast
		4/10/2016	SU	72	Sunny
		4/11/2016	MO	12	Rainy
1 10 Points I	Examina the tables	4/12/2016	TU	30	Rainy until 1:00pm, then sur
1 > 10 Follits = 1		4/13/2016	WE	73	Sunny
closely.		4/14/2016	TH	75	Sunny
-		4/15/2016	FR	74	Sunny
		4/16/2016	SA	76	Sunny
Does table Da	ly names have an	4/17/2016	SU	72	Sunny
index? NO	_	4/18/2016	MO	67	Sunny, some clouds
		4/19/2016	TU	63	Cloudy early, then sunny
		4/20/2016	WE	78	Sunny
What is the	most appropriate	4/21/2016	TH	72	Sunny
numaria subtu	na of the Daily KWH	4/22/2016	FR	34	Rainy and cloudy, some sun
numeric subiy		4/23/2016	SA	62	Cloudy early, then sunny
field? BYTE		4/24/2016	SU	77	Sunny
		4/25/2016	MO	40	Overcast, some clearing
XX 71 1	• • • • • • • • • • • •	4/26/2016	TU	10	Rainy
What is the mir	11mum possible <i>field</i>	4/27/2016	WE	79	Sunny
width of the Day	v of Week field? 2	*			
	, .	Record: I 4 9 of 30	No No	Filter Search	

Num Lock 🔲 🖪 🖪 🔽

- How many *records* are in the Solar D. table? 30
- E. What is the number of the *current record* in the **Solar** table? 9
- F. What is the number of the *current record* in the **Day Names** table? 6
- G. (2 points) If neither table had an index, how many *comparisons* would be performed in a join where the Day of Week field is joined with the Day Code field? 210
- H. (2 points) What kind of *relationship* (1:1, 1:many, many:many) actually now exists between Solar and Day Names when the Day of Week field is joined with the Day Code field? Accept either 1:many or many:many

<12> 10 Points – In the form below, set up a complete *inner join* query between the tables. The result must show the Day String, Calendar Day, and Daily KWH fields (in that order), but only where the Day of Week field matches the Day Code field. The result must be sorted in <u>ascending</u> order on the Calendar Day field. Include everything necessary in the query.



<13> 5 Points – Set up a *simple query* in the form below to list the Calendar Day and Daily KWH fields for all Wednesdays where the daily kilowatt hours is at least 75 <u>and</u> the weather is exactly the string "Sunny". Include everything necessary in the query.

6					
So	olar				
	*				
	Calendar Day				
	Day of Week				
	Daily KWH				
	weather				
Field:	Calendar Day	Daily KWH	Day of Week	Weather	
Field: Table:	Calendar Day Solar	Daily KWH Solar	Day of Week Solar	Weather Solar	
Field: Table: Sort:	Calendar Day Solar	Daily KWH Solar	Day of Week Solar	Weather Solar	
Field: Table: Sort: Show:	Calendar Day Solar	Daily KWH Solar	Day of Week Solar	Weather Solar	
Field: Table: Sort: Show: Criteria:	Calendar Day Solar	Daily KWH Solar	Day of Week Solar	Weather Solar	
Field: Table: Sort: Show: Criteria: or:	Calendar Day Solar	Daily KWH Solar	Day of Week Solar	Weather Solar ="Sunny"	

<14> 5 Points – How many records result from the query in the previous problem? 2 (4/20/2016 and 4/27/2016)