Mock Final Exam
CSci 127: Introduction to Computer Science
Hunter College, City University of New York

14 May 2019

Exam Rules

- Show all your work. Your grade will be based on the work shown.
- The exam is closed book and closed notes with the exception of an 8 1/2" x 11" piece of paper filled with notes, programs, etc.
- When taking the exam, you may have with you pens and pencils, and your note sheet.
- You may not use a computer, calculator, tablet, phone, or other electronic device.
- **Do not open this exam until instructed to do so.**

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

I understand that all cases of academic dishonesty will be reported to the Dean of Students and will result in sanctions.								
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Email:								
Signature:								

ASCII TABLE

Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char
0	0	*[NULL]*	32	20	*[SPACE]*	64	40	@	96	60	`
1	1	*[START OF HEADING]*	33	21	!	65	41	A	97	61	a
2	2	*[START OF TEXT]*	34	22	"	66	42	B	98	62	b
3	3	*[END OF TEXT]*	35	23	#	67	43	C	99	63	c
4	4	*[END OF TRANSMISSION]*	36	24	$	68	44	D	100	64	d
5	5	*[ENQUIRY]*	37	25	%	69	45	E	101	65	e
6	6	*[ACKNOWLEDGE]*	38	26	&	70	46	F	102	66	f
7	7	*[BELL]*	39	27	'	71	47	G	103	67	g
8	8	*[BACKSPACE]*	40	28	(	72	48	H	104	68	h
9	9	*[HORIZONTAL TAB]*	41	29	)	73	49	I	105	69	i
10	A	*[LINE FEED]*	42	2A	*	74	4A	J	106	6A	j
11	B	*[VERTICAL TAB]*	43	2B	+	75	4B	K	107	6B	k
12	C	*[FORM FEED]*	44	2C	,	76	4C	L	108	6C	l
13	D	*[CARRIAGE RETURN]*	45	2D	-	77	4D	M	109	6D	m
14	E	*[SHIFT OUT]*	46	2E	.	78	4E	N	110	6E	n
15	F	*[SHIFT IN]*	47	2F	/	79	4F	O	111	6F	o
16	10	*[DATA LINK ESCAPE]*	48	30	0	80	50	P	112	70	p
17	11	*[DEVICE CONTROL 1]*	49	31	1	81	51	Q	113	71	q
18	12	*[DEVICE CONTROL 2]*	50	32	2	82	52	R	114	72	r
19	13	*[DEVICE CONTROL 3]*	51	33	3	83	53	S	115	73	s
20	14	*[DEVICE CONTROL 4]*	52	34	4	84	54	T	116	74	t
21	15	*[NEGATIVE ACKNOWLEDGE]*	53	35	5	85	55	U	117	75	u
22	16	*[SYNCHRONOUS IDLE]*	54	36	6	86	56	V	118	76	v
23	17	*[ENG OF TRANS. BLOCK]*	55	37	7	87	57	W	119	77	w
24	18	*[CANCEL]*	56	38	8	88	58	X	120	78	x
25	19	*[END OF MEDIUM]*	57	39	9	89	59	Y	121	79	y
26	1A	*[SUBSTITUTE]*	58	3A	:	90	5A	Z	122	7A	z
27	1B	*[ESCAPE]*	59	3B	;	91	5B	[	123	7B	{
28	1C	*[FILE SEPARATOR]*	60	3C	<	92	5C	\	124	7C	|
29	1D	*[GROUP SEPARATOR]*	61	3D	=	93	5D	]	125	7D	}
30	1E	*[RECORD SEPARATOR]*	62	3E	>	94	5E	^	126	7E	~
31	1F	*[UNIT SEPARATOR]*	63	3F	?	95	5F	_	127	7F	*[DEL]*

(Image from wikipedia commons)

1. (a) What will the following Python code print:

```
s = "Cersei,Lannister;Daenerys,Targaryen;Margaery,Tyrell;Yara,Greyjoy"
```

i.
```
queens = s.split(';')
t = queens[1].split(',')[0]
print(t.upper())
```

Output:

ii.
```
b,c = queens[1],queens[3]
print(c[-3:])
print(b[-6:-2])
```

Output:

iii.
```
for q in queens:
    w = q.split(',')
    print(w[1],w[0][0],'.')
```

Output:

(b) Consider the following shell commands:

```
$ ls -l
drwxr-xr-x  32 stjohn  staff     1088 May 8  2019 drafts/
-rwxrwxrwx@  1 stjohn  staff  1136855 May 4  2019 finalS19V1.pdf*
-rwxrwxrwx@  1 stjohn  staff  1125569 May 4  2019 finalS19V2.pdf*
-rw-r--r--@  1 stjohn  staff   246352 May 5  2019 mapFinal.pdf
-rw-r--r--@  1 stjohn  staff   571936 May 2  2019 mapFinalCropped.jpg
drwxr-xr-x  21 stjohn  staff      714 May 3  2019 sign-in/
drwxr-xr-x   7 stjohn  staff      238 May 8  2019 submittedS19/
```

i. What is the output for:

```
$ ls *S19*
```

Output:

ii. What is the output for:

```
$ ls *S19* | wc -w
```

Output:

iii. What is the output for:

```
$ ls -l | grep "May" | wc -w
```

Output:

2. (a) Fill in the boxes with the appropriate hexcode to change the color to match the comments:

```
import turtle
thomasH = turtle.Turtle()
```

i. `#Change thomasH to be the color black:`

`thomasH.color("#` | | | | | | | `")`

ii. `#Change thomasH to be the color white:`

`thomasH.color("#` | | | | | | | `")`

iii. `#Change thomasH to be the brightest color blue:`

`thomasH.color("#` | | | | | | | `")`

iv. `#Change thomasH to be the color purple:`

`thomasH.color("#` | | | | | | | `")`

v. `#Change thomasH to be the color gray:`

`thomasH.color("#` | | | | | | | `")`

(b) Write the Python code for the following algorithm:

```
Ask user for input, and store in the string, hexString.
Set decNum = 0.
For each c in hexString,
    Set n to be ord(c)
    If n is between 48 and 57, set n to be n - ord('0').
    Otherwise, set n to be n - ord('A') + 10.
    Multiply decNum by 16 and add n to it (decNum = 16 * decNum + n).
Print decNum.
```

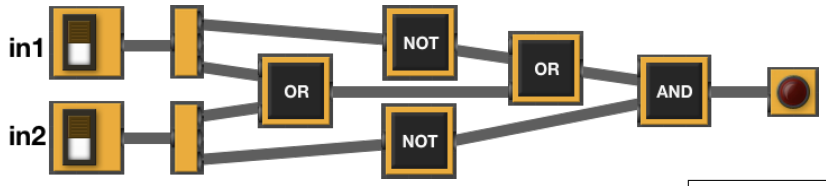
3. (a) What is the value (True/False):

i.
```
in1 = False
in2 = True
out = in1 and in2
```
out = _____

ii.
```
in1 = False
in2 = True
out = not in1 and (in2 or not in1)
```
out = _____

iii.
```
in1 = False
in2 = True and not in1
in3 = in1 and in2
out = in1 or not in3
```
out = _____

iv.




```
in1 = True
in2 = False
```
out = _____

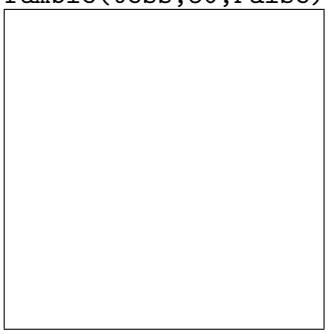
(b) Design a circuit that implements the logical expression:

```
((not in1) or (in1 and not in2)) or (in3 and not in3)
```

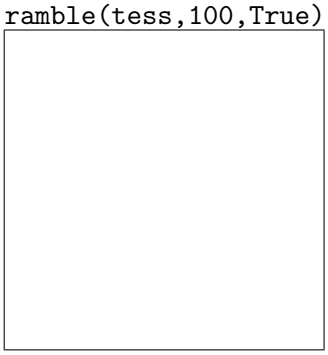
4. (a) Draw the output for the function calls:

```
import turtle
tess = turtle.Turtle()

def ramble(t, len, isNested):
  if len >= 50:
    for i in range(4):
      t.forward(len)
      t.left(90)
      if isNested:
        ramble(t,len-50,isNested)
```

i. `ramble(tess,50,False)`



ii. `ramble(tess,100,True)`



(b) For the following code:

```
def myst(tommi, rhia):
    if rhia < 5:
        return rhia
    else:
        return tommi
```

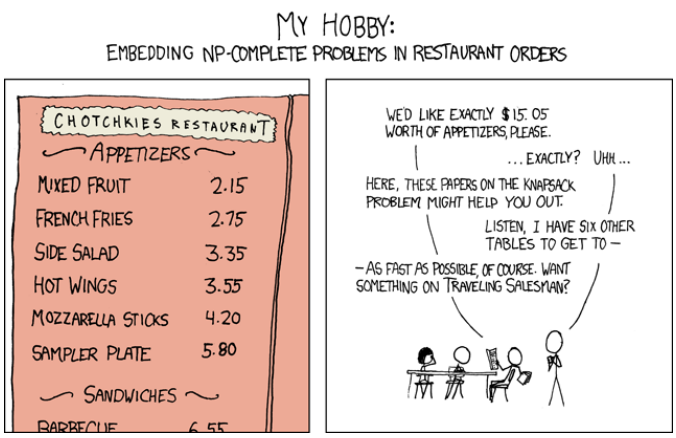
```
def start(shantel):
    mandy = 8
    savannah = myst(mandy,shantel)
    return savannah
```

i. What are the formal parameters for `myst()`:

ii. What are the formal parameters for `start()`:

iii. What does value does `start(10)` return:

5. (a) For the menu to the right, if there is an appetiziers order that will total to exactly the amount \$15.05, write it below. If there isn't, write "NO ORDER."



xkcd, #278; Alt-Text: General solutions get you a 50% tip.

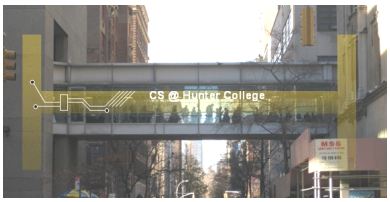
(b) Design an algorithm to solve this, for any restaurant and any dollar amount:

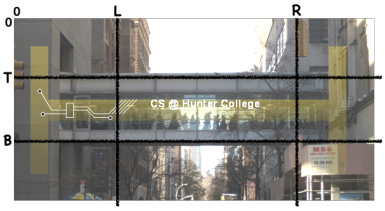
- **Input:**
- **Output:**
- **Process:**

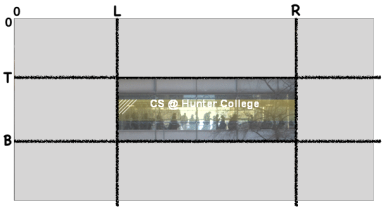
6. **Fill in the comments** to describe what each line of code does:

```
#
import folium

#
import random

#
import pandas as pd

#
landmarks = pd.read_csv('nycLandmarks.csv')

#
r = random.randrange(0,4)

#
randLat = landmarks['Latitude'][r]

#
randLon = landmarks['Longitude'][r]

#
randName = landmarks['Name'][r]

#
map = folium.Map(location=[40.75, -74.125], zoom_start=10)

#
mark = folium.Marker(location = [randLat, randLon], popup = randName)

#
mark.add_to(map)

#
map.save(outfile='nycMap.html')
```

7. Write a **complete Python program** that prompts the user for the name of an .png (image) file and the upper left and lower right coordinates ("bounding box") and displays the image cropped to the bounding box:







8. (a) What are the values of register $s0 for the run of this MIPS program:

```
#Sample program that loops up to 100
ADDI $s0, $zero, -25 #set s0 to -25
ADDI $s1, $zero, 25 #use to increment counter, $s0
ADDI $s2, $zero, 100 #use to compare for branching
AGAIN: ADD $s0, $s0, $s1
BEQ $s0, $s2, DONE
J AGAIN
DONE: #To break out of the loop
```

Values of register $s0:

(b) Indicate what modifications are needed to the MIPS program (repeated below) so that it increments by 5 stopping at 0 (shade in the box for each line that needs to be changed and rewrite the instruction in the space below).

☐ `ADDI $s0, $zero, -25 #set s0 to -25`

☐ `ADDI $s1, $zero, 25 #use to increment counter, $s0`

☐ `ADDI $s2, $zero, 100 #use to compare for branching`

☐ `AGAIN: ADD $s0, $s0, $s1`

☐ `BEQ $s0, $s2, DONE`

☐ `J AGAIN`

☐ `DONE: #To break out of the loop`

9. What is the output of the following C++ programs?

(a)

```
//M Mancina & L-M Miranda
#include <iostream>
using namespace std;
int main()
{
  cout << "If the wind in my sail ";
  cout << "on the sea stays behind me";
  cout << endl << "One day I'll know, ";
  cout << "how far I'll go\n";
}
```

Output:

(b)

```
//L-M Miranda-- more Moana
#include <iostream>
using namespace std;
int main()
{
  int count;
  cout << "For the tides, the sun,";
  cout << "the sky\nHey, ";
  for (count = 0; count < 2; count++) {
    cout << "it's okay, ";
  }
  cout << endl << "You're welcome";
}
```

Output:

(c)

```
//Counting
#include <iostream>
using namespace std;
int main()
{
  int i, j;
  for (i = 0; i < 5; i++)
  {
    for (j = 0; j < 5; j++)
      cout << i+j << " ";
    cout << endl;
  }
}
```

Output:

10. (a) Write a complete **Python program** that uses the turtle graphics library, creates a turtle, prompts the user for a string, and then controls the turtles actions:
    - 'F': moves the turtle forward
    - 'L': turns the turtle 90 degrees to the left
    - 'R': turns the turtle 90 degrees to the right

    (b) Write a **complete C++ program** that asks the total number of hours until the weekend starts, and then prints out the number of complete days and hours remaining. For example, if the user entered, `52`, the program should print: `2 days and 4 hours`.