CPSC 1040 **Name: _____**
Test #4 **December 1, 2015**

Closed notes, closed laptop, calculators OK. Please use a pencil. 100 points, 5-point bonus. Maximum score is 105. The weight of each section is shown in parentheses. If you need more space, use the back of the sheet.

A. (35 points, ½ point each) Multiple Choice, True or False, Fill in the Blanks. Put your answer in the space on the left column. Some questions have been answered for you.

1. In a dictionary, you use a(n) _____ to locate a specific value.
   a. datum b. element c. item d. key

2. What is the correct structure for creating a dictionary of month names to be accessed by month numbers?
   a. { 1 ; 'January', 2 ; 'February', 3 ; 'March' } b. { 1 : 'January', 2 : 'February', 3 : 'March' }
   c. [1 : 'January', 2 : 'February', 3 : 'March'] d. { 1, 2, 3 : 'January', 'February', 'March' }

3. What would be the result of the following code?
```
ages = {'Aaron' : 6, 'Kelly' : 3, 'Abigail' : 1 }
value = ages['Brianna']
```
   a. false b. -1 c. 0 d. KeyError

4. What is the number of the first index in a list dictionary?
   a. 0 b. 1 c. Dictionary is not indexed by number. d. Size of the dictionary minus one.

5. You created the following dictionary `relationships = {'Jimmy':'brother'}`. You then executed the following code: `relationships['jimmy']` and received a `KeyError` exception. What is the reason for the exception?
   a. String comparisons are case sensitive so 'jimmy' does not equal 'Jimmy'.
   b. You used the wrong syntax for creating the dictionary.
   c. You should have used the code `relationships['brother']`.
   d. There is a bug in Python.

6. In order to avoid `KeyError` exceptions, you can check whether a key is in the dictionary using the _____ operator.
   a. included b. of c. in d. not in

7. What is the value of the variable phones after the execution of the following code?

```
phones = {'John': '5555555', 'Julie' : '7777777'}
phones['John'] = '1234567'
```

   a. {'John': '5555555', 'Julie' : '7777777'} b. {'John': '1234567', 'Julie' : '7777777'}
   c. {'John': '1234567' } d. invalid code

8. Which statement would you use to delete an existing key-value pair from a dictionary?
   a. del b. remove c. delete d. unpair

9. Which function would you use to get the number of elements in a dictionary?
   a. size b. length c. len d. invalid code

10. Which method would you use to returns all the elements in the dictionary as a list of tuples?
    a. list b. items c. pop d. keys

11. Which method would you use to return the value associated with a specified key and remove that key-value pair from the dictionary?
    a. list b. items c. popitem d. pop

12. What does the get method do if the specified key is not found in the dictionary?
    a. Throw an exception b. Nothing c. Return a default value
    d. You do not specify a key for the get method

13. Which of the following does not apply to sets?
    a. The stored elements can be of different data types.
    b. All the elements must be unique – no two elements can have the same value.
    c. The elements are unordered.
    d. The elements are pairs.

14. What method can be used to add a group of elements to a set?
    a. add b. addgroup c. update d. Elements must be added one at a time.

15. What is the process used to convert an object to a stream of bytes that can be saved in a file?
    a. Pickling b. Streaming c. Writing d. Dumping

16. A(n) _____ is a set of real-world objects, parties, and major events related to the problem.
    a. class b. problem domain c. object d. instance

17. What does the acronym UML stand for?
    a. Unified Modeling Language b. United Modeling Language
    c. Unified Model Language d. United Model Language

18. Which section in the UML holds the list of the class's data attributes?
    a. First b. Second c. Third d. Fourth

19. Which section in the UML holds the list of the class's methods?
    a. First b. Second c. Third d. Fourth

20. What type of method provides a safe way for code outside a class to retrieve the values of attributes, without exposing the attributes in a way that they could be changed by the code outside the method?
    a. Accessor b. Mutator c. Setter d. Class

21. What attributes belong to a specific instance of the class?
    a. Instance b. Self c. Object d. Data

22. What is the special name given to the method that returns a string containing the object's state?
    a. __state__ b. __obj__ c. __str__ d. __init__

23. Which method is automatically executed when an instance of the class is created in memory?
    a. __state__ b. __obj__ c. __str__ d. __init__

24. When a method is called, what does Python make to reference the specific object on which the method is supposed to operate?
    a. state variable b. self parameter c. object data d. init procedure

25. What type of programming contains class definitions?
    a. Procedural b. Object c. Object-oriented d. Modular

26. What is, conceptually, a self-contained unit that consists of data attributes and methods that operate on the data attributes?
    a. Class b. Object c. Instance d. Module

27. What are the procedures that an object performs called?
    a. Methods b. Actions c. Modules d. Instances

28. What is the combining of data and code in a single object known as?
    a. Modularity b. Instantiation c. Encapsulation d. Objectification

29. What is another name for the mutator methods?
    a. Setters b. Getters c. Instances d. Attributes

30. What is another name for the accessor methods?
    a. Setters b. Getters c. Instances d. Attributes

TRUE/FALSE

1. You would typically use a for loop to iterate over the elements in a set.

2. Sets are immutable.

3. Sets are created using curly braces {}.

4. The set remove and discard methods behave differently only when a specified item is not found in the set.

5. A dictionary can include the same value several times, but cannot include the same key several times.

6. The union of two sets is a set that contains only the elements that appear in both sets.

7. The difference of set1 and set2 is a set that contains only the elements that appear in set1 but do not appear in set2.

8. The index of the first element in a set is 0.

9. The index of the first key-value pair in a dictionary is 0.

10. The `issubset` method can be used to determine whether set1 is a subset of set2.

11. A mutator method has no control over the way that a class's data attributes are modified.

12. In a UML diagram, the middle section holds the list of the class's methods.

13. Procedures operate on data items that are separate from the procedures.

14. Object-oriented programming allows us to hide the object's data attributes from code that is outside the object.

15. The instances of a class share the data attributes in the class.

16. A class definition is stored in the library so that it can be imported into any program.

17. The self parameter need not be named self, but it is strongly recommended to conform with standard practice.

18. The self parameter is required in every method of a class.

19. A class might be thought of as a 'blueprint' that an object may be created from.

20. An object is a stand-alone program but is used by programs that need its service.

FILL IN THE BLANKS

1. A(n) _____ is an object that holds multiple unique items of data in an unordered manner.

2. The _____ of two sets is a set that contains all the elements of both sets.

3. The built-in function _____ returns the number of items in a set.

4. To add a single item to a set, you can use the set method _____.

5. Each element in a(n) _____ has two parts: a key and a value.

6. The elements in a dictionary are not stored in a specific order. Therefore a dictionary is not a(n) _____.

7. To determine whether a key is not included in a dictionary, or an element is not included in a set, you can use the _____ operator.

8. The _____ method returns a value associated with a specified key and if found, removes that key-value pair from the dictionary.

9. The _____ method clears the contents of a dictionary.

10. To write an object to a file, you use the _____ function of the _____ module.

11. A(n) _____ is code that specifies the data attributes and methods for a particular type of object.

12. Each object that is created from a class is called a(n) _____ of the class.

13. A class _____ is a set of statements that define a class's methods and data attributes.

14. A(n) _____ method in a class initializes an object's data attributes.

15. An object's _____ is simply the values of the object's attributes at any given moment.

16. The _____ attributes are created by the `self` parameter and they belong to a specific instance of the class.

17. A method that returns a value from a class's attribute but does not change it is known as a(n) _____ method.

18. _____ provides a set of standard diagrams for graphically depicting object-oriented systems.

19. In _____ programming, the programming is centered on objects that are created from abstract data types that encapsulate data and functions together.

20. _____ programming is a method of writing software that centers on the actions that take place in a program.

B. Python Programming (40 points) Put your answers in the space on the right.

1. (5) Assume that the variable `dct` references a dictionary. Write an `if` statement that determines whether the key `'James'` exists in the dictionary. If so, display the value that is associated with that key. If the key is not in the dictionary, display a message indicating so.

2. (5) Assume each of the variables `set1` and `set2` references a set. Write code that creates another set containing all the elements of `set1` and `set2` and assigns the resulting set to the variable `set3`.

3. (5) Assume each of the variables `set1` and `set2` references a set. Write code that creates another set containing the elements that appear in `set2` but not in `set1` and assigns the resulting set to the variable `set3`.

4. (5) In a Python class, how do you hide an attribute from code outside the class?

5. (5) How do you call the `__str__` method?

6. (5) Assume that the variable `dct` references a dictionary. Write a statement that deletes the key `'James'` from the dictionary. Your statement should not generate a `KeyError`.

7. (10) What will the following code print? Put your answers in the space on the right.

```
myset1 = set(['1', '2', '3'])
print('myset1 = ', myset1)

myset2 = set([2, 4, 4, 6, 6, 6, 6, 6])
print('myset2 = ', myset2)

myset3 = set('Saturn')
print('myset3 = ', myset3)

set1 = set([10, 20, 30, 40])
set2 = set([40, 50, 60])
myset4 = set1.difference(set2)
print('myset4 = ', myset4)

myset5 = set1.union(set2)
print('myset5 = ', myset5)
```

C. Number Conversions (10 points)

Convert the numbers shown in the table from one base to another and fill in the missing entries.

Decimal	Binary	Octal	Hexadecimal
179			
	1001 1100		
		571	
			79C

D. ASCII Table (5 points)

Consider the ASCII Table below. For the Hex (hexadecimal) column, **ignore the "0x" prefix**. That means that the letter 'a' has Hex code 61 and the number 9 has hex code 39. The Hex encoding of a mystery string is shown on the right. Complete the entries by showing the equivalent encodings in Hexadecimal, Decimal, and Character.

ASCII table

Char	Dec	Oct	Hex	Char	Dec	Oct	Hex	Char	Dec	Oct	Hex	Char	Dec	Oct	Hex
(nul)	0	0000	0x00	(sp)	32	0040	0x20	@	64	0100	0x40	`	96	0140	0x60
(soh)	1	0001	0x01	!	33	0041	0x21	A	65	0101	0x41	a	97	0141	0x61
(stx)	2	0002	0x02	"	34	0042	0x22	B	66	0102	0x42	b	98	0142	0x62
(etx)	3	0003	0x03	#	35	0043	0x23	C	67	0103	0x43	c	99	0143	0x63
(eot)	4	0004	0x04	$	36	0044	0x24	D	68	0104	0x44	d	100	0144	0x64
(enq)	5	0005	0x05	%	37	0045	0x25	E	69	0105	0x45	e	101	0145	0x65
(ack)	6	0006	0x06	&	38	0046	0x26	F	70	0106	0x46	f	102	0146	0x66
(bel)	7	0007	0x07	'	39	0047	0x27	G	71	0107	0x47	g	103	0147	0x67
(bs)	8	0010	0x08	(	40	0050	0x28	H	72	0110	0x48	h	104	0150	0x68
(ht)	9	0011	0x09	)	41	0051	0x29	I	73	0111	0x49	i	105	0151	0x69
(nl)	10	0012	0x0a	*	42	0052	0x2a	J	74	0112	0x4a	j	106	0152	0x6a
(vt)	11	0013	0x0b	+	43	0053	0x2b	K	75	0113	0x4b	k	107	0153	0x6b
(np)	12	0014	0x0c	,	44	0054	0x2c	L	76	0114	0x4c	l	108	0154	0x6c
(cr)	13	0015	0x0d	-	45	0055	0x2d	M	77	0115	0x4d	m	109	0155	0x6d
(so)	14	0016	0x0e	.	46	0056	0x2e	N	78	0116	0x4e	n	110	0156	0x6e
(si)	15	0017	0x0f	/	47	0057	0x2f	O	79	0117	0x4f	o	111	0157	0x6f
(dle)	16	0020	0x10	0	48	0060	0x30	P	80	0120	0x50	p	112	0160	0x70
(dc1)	17	0021	0x11	1	49	0061	0x31	Q	81	0121	0x51	q	113	0161	0x71
(dc2)	18	0022	0x12	2	50	0062	0x32	R	82	0122	0x52	r	114	0162	0x72
(dc3)	19	0023	0x13	3	51	0063	0x33	S	83	0123	0x53	s	115	0163	0x73
(dc4)	20	0024	0x14	4	52	0064	0x34	T	84	0124	0x54	t	116	0164	0x74
(nak)	21	0025	0x15	5	53	0065	0x35	U	85	0125	0x55	u	117	0165	0x75
(syn)	22	0026	0x16	6	54	0066	0x36	V	86	0126	0x56	v	118	0166	0x76
(etb)	23	0027	0x17	7	55	0067	0x37	W	87	0127	0x57	w	119	0167	0x77
(can)	24	0030	0x18	8	56	0070	0x38	X	88	0130	0x58	x	120	0170	0x78
(em)	25	0031	0x19	9	57	0071	0x39	Y	89	0131	0x59	y	121	0171	0x79
(sub)	26	0032	0x1a	:	58	0072	0x3a	Z	90	0132	0x5a	z	122	0172	0x7a
(esc)	27	0033	0x1b	;	59	0073	0x3b	[	91	0133	0x5b	{	123	0173	0x7b
(fs)	28	0034	0x1c	<	60	0074	0x3c	\	92	0134	0x5c	|	124	0174	0x7c
(gs)	29	0035	0x1d	=	61	0075	0x3d	]	93	0135	0x5d	}	125	0175	0x7d
(rs)	30	0036	0x1e	>	62	0076	0x3e	^	94	0136	0x5e	~	126	0176	0x7e
(us)	31	0037	0x1f	?	63	0077	0x3f	_	95	0137	0x5f	(del)	127	0177	0x7f

Hexadecimal:

Octal:
0114 0141 0163 0164
0040 0167 0145 0145
0153 0041

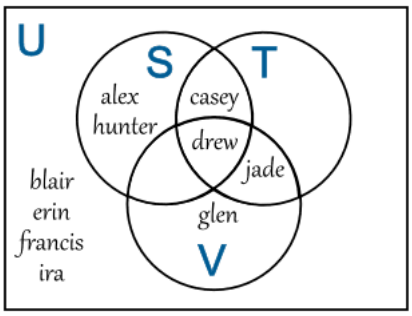
Decimal:

Character:

E. Sets (10 points)

Consider the Venn diagram shown below right. Then evaluate the set expressions below left showing the contents of the resulting set. Note that $\mathbf{A^C}$ represents **A−complement** or **A-inverse.** The first two have been done for you.

$S \cap T$ = {casey, drew} $(S \cap V) \cap T^C$ = Ø = {} = empty set



$(S \cup (T \cap V))$ = _____

$(S - V)$ = _____

$(S \cup T)^C$ = _____

$(S^C \cap V)$ = _____

$(S \cup T) - V$ = _____

F. Bonus Question (5 points) Venn Diagram

A guidance counselor is planning schedules for 30 students. Sixteen students say they want to take French, 16 want to take Spanish, and 11 want to take Latin. Five say they want to take both French and Latin, and of these, 3 wanted to take Spanish as well. Five want only Latin, and 8 want only Spanish. How many students want French only? **Draw the Venn diagram.**