PES University, Bengaluru

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UE20CS101

APRIL 2021: IN SEMESTER ASSESSMENT B Tech 1 SEMESTER CHEMISTRY CYCLE

UE20CS101 (4 credit subject) - Python for Computational Problem Solving

Time: 3 Hrs	Answer All Questions	Max Marks: 100

1.	a)	Evaluate the following expressions: i) print(4 / 2 ** 3) ii) a = 7; b = 2; print(a >> b << b) iii) print(~~~3 ** 2) iv) print(1,2 in [1,2,3,4,5]) v) a = 3; b = 4; print(a and b)		5
	b)	Write a program using control structures to print the following pattern: 4 3 4 2 3 4 1 2 3 4		6
	c)	State whether True or False: i) In Python, a comma can be used in numerical literal values greater than 999. That is, one thousand can be represented as either 1,000 or 1000 within a Python program. ii) The binary number 1000 is larger than binary number 0111 iii) identifier **line** and **Line** are the same in python iv) if Statement may contain as many else headers as necessary v) All input is returned by the input function as a string type		5

	d)	What is the output?
		i)
		i = 0
		while i<3:
		print(i,end = ' ')
		i++
		print(i+1)
			ii)
			i = 2
			while True:
			if i%3 == 0:
			break
			print(i)
			i += 2
				4

		iii) x = "abcdef" i = "a" while i in x: x = x[:-1] print(i, end = " ")		
2.	a)	Write a program to find the frequency of words in a given string using dictionary. **Example**: string = "how much wood would a wood chuck chuck if a wood chuck could chuck wood" **output** : {'how': 1, 'much': 1, 'wood': 4, 'would': 1, 'a': 2, 'chuck': 4, 'if': 1, 'could': 1}		6

	b)	What is the output for the following?
		i)
		s = '1 2 3 4 5'
		for ch in s.split(' ')[::-1]:
		print(ch , end = ',')
		
		ii)
		s = ['ab' , 'cd']
		for i in s:
		i.upper()
		print(i , end = ' ')
		
		iii) s1 = {2,4,6} ; s2 = {6,8,10}; print(s2 – s1)
		
		iv) a = [3,5,7]; b = a; a[0] = 2; print(b)
		v)
		for i in ''.join(sorted(list('python'))):
		print (i,end =',')
			8
			(2+2+1+1+2)

	c)	Write a function that returns all prime numbers between 2 to n	6
3.	a)	Write a program to find the GCD (Greatest Common Divisor) of two numbers using recursion.	6
	b)	Read the contents of a file and display the frequency of a given word in the file Example: word = 'chuck' **Output**: 'chuck' occurs 3 times in the file	6

	c)	What is the output?
		i)
		def outer(n):
		def inner(x):
		nonlocal n
		n += 1
		return n*x
		return inner
		
		d = outer(2)
		r = d(3)
		print(r)
		
		ii)
		def fn(x,y=[]):
		y.append(x)
		return y
		print(fn(2,[3,4]))
			2+2

	d)	i) Explain with example the syntax of the button function in the tkinter module. ii) Differentiate between pack and grid methods to place widgets in the tkinter window. Demonstrate with examples.	4
4.	a)	i) Generate a list of even numbers between 7 and 50 that are divisible by 7 ii) what is the output of the following snippets of code? a) li=[1, -2, -3, 4, 5] def fn(x): return x<2 m=filter(fn, li) print(list(m))	6 (2+2+2)

		b) print(list(map((lambda x:x^2), range(5))))	
	b)	Write a user defined function to mimic reduce and use it to find the shortest string from a list of strings strings = [‘this’ , ‘is’ , ‘the’ , ‘endgame’] **output**: ‘is’	6

	c)	What is the output of the following? what does the function generate?
		
		def example():
		n1,n2=0,1
		while True:
		yield n1
		n1,n2=n2,n1+n2
		
		e = example ()
		for i in range(5):
		print(next(e))
			4

	d)	i) Write a test function that checks if the return value of a given function is a string and displays an appropriate error message. ii) write the command to run a test file from the terminal / command prompt	3+1
5	a)	Create a class Stack that implements the working of a stack system. The class will have attributes such as **limit**: maximum number of plates in a stack (consider the limit as 10) and **plate_stack**: which is a list of plate id’s in the stack. A stack follows the principle of Last in - First out. Implement the following methods: **add2stack** : that adds a number(id) of a plate to the top (end) of the stack and also indicates that the stack is full if there are already 10 plates in the stack and **popStack**: that removes one plate from the top (end) of the stack and indicate if the stack is empty and there are no more plates to remove from the stack.	8

	b)	i) Differentiate between inheritance and object composition.
		
		ii) What is the output of the following codes?
		a)
		class A:
		def __init__(self,n):
		self.num1 = n
		class B(A):
		def __init__(self):
		self.num2 = 1
		self.a = A(3)
		obj = B()
		print(len(obj.__dict__))
		
		b)
		class Phone:
		def __init__(self,n):
		self.num = n
		self.service = 'Airtel'
		class Person:
		def __init__(self,name):
		self.name = name
		self.ph = Phone(9855886601)
		person = Person('John')
		print(len(person.__dict__))
			6
			(2+2+2)

	c)	Write a program that allows the user to enter 10 non-zero numbers, entering one number at a time. Write a user defined exception that is raised if the user enters 0 (zero).	6