

**National University**

**of Computer & Emerging Sciences Peshawar Campus**



Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Roll No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Program: BSCS

Semester: SPRING – 2018

Time Allowed: 3: 00 hours

Course: CS101 (Introduction to Computing)

Examination: Final

Total Marks: 60 Weightage: 50 %

Date: 8/5/2018

Instructor: Shakir Ullah Shah

**NOTE:** Attempt all questions. In case of an ambiguity in a question, make an assumption, write your assumption and carry on with the question.  ***You can use python or any c based language until specified.***

# 2. Python syntax

def my\_function(val):

return val+1, val+2, val+3

r = my\_function(3)

print r

(4, 5, 6)

type(r) # What type of object is r?

<type ’tuple’>

1. What is the output of the following program segment? [3+2+1+2+2]

# 1. Python syntax

days = "Mon Tue Wed Thu Fri Sat Sun"

months = "Jan\nFeb\nMar\nApr\nMay\nJun\nJul\nAug"

print "Here are the days: ", days

print "Here are the months: ", months

print """

It is an example of docstring.

It might go on three lines.

That’s the end.

"""

solution

Here are the days: Mon Tue Wed Thu Fri Sat Sun

Here are the months: Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

It is an example of docstring.

It might go on three lines.

That’s the end.

# 3. Python syntax

neslist = [['a', 'b', 'c'], ['d', 'e', 'f'], ['g', 'h']]

print neslist[-2][-2:]

solution

['e', 'f']

// 5. C++ syntax

int sum(int x, int y)

{

return x+x;

}

int main()

{

cout<<sum(sum(3,5),sum(8,4))<<endl;

}

// 4. C++ syntax

const int NUMBER\_OF\_ROWS = 3;

const int NUMBER\_OF\_COLUMNS = 3;

int matrix[NUMBER\_OF\_ROWS][NUMBER\_OF\_COLUMNS]=

{{10,12,23},{8,6,3},{3,2,1}};

int row=1,col,sum=0;

for (col = 0; col < NUMBER\_OF\_COLUMNS; col++)

sum = sum + matrix[row][col];

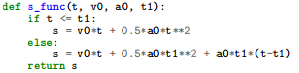
cout<<sum;

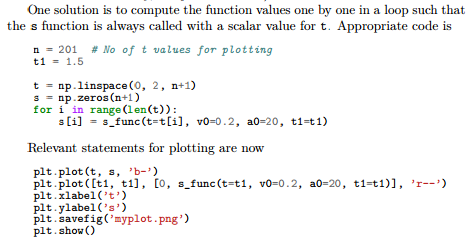
1. Give precise answer [2 marks to each]
   1. Describe briefly the main elements of a computer system.
   2. Write the core objective(s) of Introduction to Computing
   3. Write any two strategies to avoid bugs.
   4. Why abstraction is so much important?
   5. Write at max three statements to initialize a three-dimensional array/list ‘**my3DList**’with **zeros**. The size of the first dimension is 10 , the size of the second dimension is 5 , and the size of the third dimension is 7. The total number of components in the array/list is 10 \* 5 \* 7 = 350
2. What is the difference between: [2 marks to each]
   1. compiler and interpreter
   2. structured design and object oriented design
   3. comments and docstring
   4. static scoped and dynamic scoped languages
   5. syntax error and logical error
   6. Iterative approach and recursive approach

1. How data and function can be combined into user defined data structure (Abstract Data Type) ? Give a solid example of code. [3 marks]
2. Write a function to implement below equation that takes t, v0, a0 and t1, you need to branch into one type of condition if t ≤ t1 and another type of condition if t > t1. [5 marks]



Solution:





1. Let you have a to be a two-dimensional array/list with the following elements [6 marks]

23 5 6 15 18

4 16 24 67 10

12 54 23 76 11

1 12 34 22 8

81 54 32 67 33

12 34 76 78 9

Write a function that print the largest element of each row

**Sample Run:**

The largest element in row 1 = 23

The largest element in row 2 = 67

The largest element in row 3 = 76

The largest element in row 4 = 34

The largest element in row 5 = 81

The largest element in row 6 = 78

solution

void largestInRows(int matrix[][NUMBER\_OF\_COLUMNS],

int noOfRows)

{

int row, col;

int largest;

//Largest element in each row

for (row = 0; row < noOfRows; row++)

{

largest = matrix[row][0]; //Assume that the first element

//of the row is the largest.

for (col = 1; col < NUMBER\_OF\_COLUMNS; col++)

if (largest < matrix[row][col])

largest = matrix[row][col];

cout << "The largest element of row " << (row + 1)

<< " = " << largest << endl;

}

}

1. Define a procedure product(m, n) , which returns the product of m and n , assuming that n is a positive integer. Don't use \* ; instead, use a loop, and + operator. [6 marks]
2. Write a program that reads a given text from a file, outputs the text as it is, and also prints the number of lines and the number of times each letter appears in the text. An uppercase letter and a lowercase letter are treated as being the same; that is, they are tallied together. [8 marks]

Because there are 26 letters, you can use an array/list of 26 components to perform the letter count. You also need a variable to store the line count.

The text is stored in a file, ‘**textin.txt’** . The output will be stored in a file, ‘**textout.txt’**.

**Input** A file containing the text to be processed.

**Output** A file containing the text, number of lines, and the number of times a letter appears in the text

Note**:**; If the file doesn’t exist, your program should not crash