Quaid-e-Awam University of Engineering, Science and Technology Nawabshah

Artificial Intelligence Department
Mid-Semester Examination

Subject:	Programming Fundamentals	**Semester:**	First
Batch:	21 BS(AI)	**Date:**	17.02.2022
Maximum marks:	20	**Time allowed:**	60 minutes

Note: Attempt any two questions.

Q #	Question	Max. Marks
01. a)	How do computers solve a problem? Compare the levels of abstractions of programming computers and mention the tools used to convert from one level to another level of abstraction e.g., from high-level to assembly language code.	(05)
b)	What are the basic data types available in Python? How does the type conversion work? Provide programming examples to convert and print type of the basic data types.	(05)
02. a)	Provide examples using Python syntax to initialize and print a string variable using the print function. Given two string variables s1 and s2, how to check whether they are equal?	(03)
b)	Write a program that inputs two strings using the input function. The program then checks whether (1) both strings start with a capital letter, (2) the first two characters of both strings are same, and (3) Both strings have at least 5 characters. *Hint: use `s.upper()` function to convert to upper case and `len(s)` to find the length*	(07)
03. a)	What output is printed by the following Python code?	(03)
b)	Write a program in Python that inputs two integers (x and y). The program will print the sum of x and y if the right most digit of either x or y is odd. If the right most digits of both numbers are not odd, the program just prints the two numbers as they are. *Hint: The modulus operator (%) can be used to get the right most digit.*	(07)

```
s="ASCII"
if (s[-1].upper()==s[len(s)-1] and len(s)>=5):
    print(s[-2:])
else:
    print(s[:])
```

Solution

Q. 01 a) How do computers solve a problem? Compare the levels of abstractions of programming computers and mention the tools used to convert from one level to another level of abstraction e.g., from high-level to assembly language code.

Answer: Digital computers solve problems by means of computer programs. A computer program is a sequence of instructions which are executed by a computer and in turn, solving a complex problem under the hood.

A level of abstraction determines how detailed are the instructions of a program. At the highest level the programs represent instructions in a more abstract manner while hiding most of the details. At the assembly language level, the instructions are more detailed and somewhat harder to understand when compared to the high-level language level. The machine language level represents instructions/programs in only binary language which is the hardest of all levels.

A compiler/interpreter can convert a high-level language code directly in to machine code or sometimes in to a middle level representation such as assembly code. An assembler can then covert the code in to machine language.

b) What are the basic data types available in Python? How does the type conversion work? Provide programming examples to convert and print type of the basic data types.

Answer: There are three basic data types available in Python: An integer type is used to store a whole number e.g., 10,20, 35. An integer variable can be used in Python as shown in the following:

```
val=20       # val is an integer variable holding value 20
```

Another basic data type is float which can hold fractional data i.e., 2.5, 100.25. An example of a float variable in Python is given below:

```
temp=20.5    # temp is a flaot variable holding value 20.5
```

The third basic data type is a string which could hold sequence of characters. An example is given below:

```
s1=”QUEST”          # s1 is a string variable holding value “QUEST”
```

When it comes to type conversion, Python has some restrictions on converting one type to another. For example, an integer can be converted to float and vice versa using the functions float() and int(), respectively. However, a string containing non-numeric value e.g., one or characters cannot be converted to either integer or flaot. However, an integer or a float value can be converted to a string using the str() function.

Q. 2. a) Provide examples using Python syntax to initialize and print a string variable using the print function. Given two string variables s1 and s2, how to check whether they are equal?

Answer: A string can be initialized in Python as the following:

```
s1=”QUEST”
```

In order to print the value of s1, the print function can be used as the following:

```
print(s1)
```

If two strings i.e., s1 and s2 need to be checked whether they are equal/same, following python syntax can be used:

```
s1==s2
```

The above condition will result in either True or False. Often the condition is used in an if-else structure.

b) Write a program that inputs two strings using the input function. The program then checks whether (1) both strings start with a capital letter, (2) the first two characters of both strings are same, and (3) Both strings have at least 5 characters.

Hint: use `s.upper()` function to convert to upper case and `len(s)` to find the length

```
s1=input("Enter first string:")
s2=input("Enter second string:")
print("Both have first letter CAPITAL?",s1[0].upper()==s1[0] and s2[0].upper()==s2[0])
print("Both have same first 2 letter?",s1[0:2]==s2[0:2])
print("Both have 5 or more letters?",len(s1)>=5 and len(s2)>=5)
```

a) What output is printed by the following Python code?

```
s="ASCII"
if (s[-1].upper()==s[len(s)-1] and len(s)>=5):
    print(s[-2:])
else:
    print(s[:])
```

Answer: `II`

b) Write a program in Python that inputs two integers (x and y). The program will print the sum of x and y if the right most digit of either x or y is odd. If the right most digits of both numbers are not odd, the program just prints the two numbers as they are.

Hint: The modulus operator (%) can be used to get the right most digit.

```
x=int(input("Enter x:"))
y=int(input("Enter y:"))
right_x=x%10
right_y=y%10
if right_x%2!=0 or right_y%2!=0:
    print(x+y)
else:
    print(x,y)
```