Cairo University **Faculty of Computers and Artificial Intelligence**

Data Compression **Third year (2022-2023)**

(Fall 2022)

Sheet 1

Dictionary Based Compression

Question-1

Given the following stream of alphabets (20 Charachters):

xyxyxyxyxyxyzzzzzzzz

Each character is saved in a byte and the ASCII code of **x**=120, **y**=121, and **z**=122

(i) Compress the above stream using LZ77, LZ 78, LZW

(ii) Calculate the original size and Compressed size in all methods

Question-2

- Compress the following stream using LZW technique (20 characters)

KLMLMKLMLMLMLMKKKKML

Calculate the compression ratio. assume each character is originally stored in 8 bits. Comment on your results.

Note: Ascii code of K,L,M are 75, 76, and 77 respectively.

Question-3

Get the compressed size of the given stream in the following cases:

(N.B. Handel Repetitive Pattern if needed).

XYYXZYXYYYYXYYXYYX

(i) LZ77 With search window size=5 and Look Ahead Buffer size=4

(ii) LZ77 with no Restrictions is given for window size and Look Ahead Buffer sizes

(iii) LZ 78

(iv) Which algorithm can compress data more effectively ??

Question-4

Consider the following sequence

ABAAAAAAABBBBBBAA

(i) Compress using LZ77

(ii) Compress using LZ77 with Consecutive one symbol into consideration

(iii) Compress using LZ77 with Consecutive two symbol into consideration

(iv) Which algorithm can compress data more effectively ??

Question-5

For the following Tags, Get the Original Stream

1. <0,0,a>,<0,0,b>,<0,0,C>,<1,1,b>,<5,1,C>,<2,1,b>,<4,3,a>,<6,2,b>
2. <0,0,'X'>,<0,0,'Y'>,<2,1,'X'>,<1,5,'Y'>,<1,5,'X'>,<1,1,'X'>
3. <0,'X'>,<0,'Y'>,<0,'Z'>,<3,'Y'>,<1,'Y'>,<2,'Y'>,<3,'X'>,<3,'L'>,<3,'X'>
4. 65,66,67,128,129,131,130,132,135,128,133

Note: Ascii code of X,Y,Z are 65, 66, and 67 respectively.