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**Assignment Lesson08**

1) Find encoder and decoder of LZ78? If we have:

Input string: “abdcaedbdcecabbdeacb”

2) Find encoder and decoder of LZ78? If we have:

Input string: “cdaabbefacbdegfeeabfedegg”

**Answer:**

1). Find encoder and decoder of LZ78.

- Base dictionary

|  |  |
| --- | --- |
| **Entry** | **codeword** |
| a | 1 |
| b | 2 |
| c | 3 |
| d | 4 |
| e | 5 |

* Encoder:

|  |  |  |
| --- | --- | --- |
| **Entry** | **Codeword** | **Output** |
| ab | 6 | <1,2> |
| dc | 7 | <4,3> |
| aed | 8 | <1,5> |
| bd | 9 | <2,4> |
| dce | 10 | <7,5> |
| cab | 11 | <3,2> |
| ec | 12 | <5,3> |
| abb | 13 | <6,2> |
| de | 14 | <4,5> |
| acb | 15 | <1,3> |
| EOF | EOF | <5, > |

Thus, Encoder = {<1,2>, <4,3>, <1,5>, <2,4>, <7,5>, <3,2>, <5,3>, <6,2>,<4,5>, <1,3>, <5, >, EOF}

* Decoder:

|  |  |  |  |
| --- | --- | --- | --- |
| **Input** | **Codeword** | **Entry** | **Output** |
| <1,2> | 5 | ab | ab |
| <4,3> | 6 | cd | cd |
| <1,5> | 7 | ae | ae |
| <2,4> | 8 | bd | bd |
| <7,5> | 9 | cde | cde |
| <3,2> | 10 | cb | cb |
| <5,3> | 11 | ec | ec |
| <6,2> | 12 | abb | abb |
| <4,5> | 13 | de | de |
| <1,3> | 14 | ac | ac |
| <5, > | EOF | ae | ae |

Thus, Decoder of string “abdcaedbdcecabbdeacb” is “**abcdaebdcdecbecabbdeacae**”

2). Find encoder and decoder of LZ78? If we have:

Input string: “cdaabbefacbdegfeeabfedegg”

* Base dictionary

|  |  |
| --- | --- |
| Entry | Codeword |
| c | 1 |
| d | 2 |
| a | 3 |
| b | 4 |
| e | 5 |
| f | 6 |
| g | 7 |

* Encoder:

|  |  |  |
| --- | --- | --- |
| **Entry** | **Codeword** | **Output** |
| ca | 8 | <1,4> |
| cd | 9 | <2,3> |
| aab | 10 | <3,4> |
| be | 11 | <4,5> |
| ef | 12 | <5,6> |
| acb | 13 | <8,2> |
| bd | 14 | <9,4> |
| eg | 15 | <11,7> |
| fee | 16 | <12,5> |
| abf | 17 | <10,6> |
| ed | 18 | <14,2> |
| egg | 19 | <15,7> |
| EOF | EOF | <16, > |

Thus Encoder = <1,4>, <2,3>, <3,4>, <4,5>, <5,6>, <8,2>, <9,4>, <11,7>, <12,5>, <10,6>, <14,2>, <15,7>, <16, >, EOF}

* Decoder:

|  |  |  |  |
| --- | --- | --- | --- |
| **Input** | **Codeword** | **Entry** | **Output** |
| <1,4> | 8 | ca | ca |
| <2,3> | 9 | da | da |
| <3,4> | 10 | ab | ab |
| <4,5> | 11 | be | be |
| <5,6> | 12 | ef | ef |
| <8,2> | 13 | cad | cad |
| <9,4> | 14 | dab | dab |
| <11,7> | 15 | beg | beg |
| <12,5> | 16 | efe | efe |
| <10,6> | 17 | abf | abf |
| <14,2> | 18 | dabd | dabd |
| <15,7> | 19 | begg | begg |
| <16, > | EOF | efed | efed |

Thus, Decoder of string “**cdaabbefacbdegfeeabfedegg**” is cadaabbeefcaddabbegefeabfdabdbeggefed