Programming Assignment - PU/507/ADV/308
Submitted By: Debendranath Das

Program: Implementation of modified version of ZUC 1.4 Stream Cipher
File Name: zuc_M.c
Compilation Command (For Linux Terminal): gcc zuc_M.c -o zuc_M
Execution Command (For Linux Terminal): ./zuc_M
Output: As given below -

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cssc@cssc-Latitude-3490:~$ gcc zuc_M.c -o zuc_M
cssc@cssc-Latitude-3490:~$ ./zuc_M

*********************************************************************************************
*                                ZUC M (Modified Version of ZUC 1.4)                        *
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Please enter a 16-Byte Key in Hexadecimal Form (32 Hex Digits): 0xB11EB43C9C7FA2884EFB4EA0C2853A56

Please enter a 16-Byte IV in Hexadecimal Form (32 Hex Digits):  0xD2FD175223C1FE8B7E495A41B70FDD27

Please enter the required size of the Output Key Stream in Bytes (it should be multiple of 4): 256

Total No of Generated Key-words (4 Bytes each): 64

Key-word 01: 10001100100001010111001110001111 (0x8C8AE71E)
Key-word 02: 11000001100111110110111000011110 (0xC19F6E1E)
Key-word 03: 00100111011011000111100110110011 (0x276C79B3)
Key-word 04: 00110111111100000101110000101101 (0x37F05C2D)
Key-word 05: 01100111011010000011011010001010 (0x6768368A)
Key-word 06: 11101011100100100011001111101100 (0xEB9233EC)
Key-word 07: 11111011111100101011100110100111 (0xFBF2B9A7)
Key-word 08: 10110111101010101010111110110000 (0xB7AAAFB0)
Key-word 09: 00100011011000000000111011011100 (0x23600EDC)
Key-word 10: 00010101111000101011010010010011 (0x15E2B493)
Key-word 11: 10111001011001000110000101100000 (0xB9646160)
Key-word 12: 10000101001110110010000100100011 (0x853B2123)
Key-word 13: 11101000110001101110011000111111 (0xE8C6E63F)
Key-word 14: 11100011111011000111010101111010 (0xE3EC757A)
Key-word 15: 00100010010001101010011000010000 (0x2246A610)
Key-word 16: 00100100010011000110000110110101 (0x244C61B5)
Key-word 17: 11010010011101100001010111111011 (0xD27615FB)
Key-word 18: 01001110010100100011110010101011 (0x4E523CAB)
Key-word 19: 11111110111000111010011010010000 (0xFEE3A690)
Key-word 20: 10110101000000110111000011000110 (0xB50370C6)
Key-word 21: 01110101010011100000010101110101 (0x754E0575)
Key-word 22: 11011011001100010011100001111000 (0xDB313878)
Key-word 23: 00110010000000010101001010010000 (0x32015290)
Key-word 24: 01011100111011010100100010101011 (0x5CDA915B)
Key-word 25: 00010110111010101001101100001111 (0x16EA9B0F)
Key-word 26: 10110010010110011111110100101111 (0xB259FD2F)
Key-word 27: 00010101110110010011110100010000 (0x15D93D10)
Key-word 28: 01001011010001001001000111001110 (0x4B4491CE)
Key-word 29: 11010111101001100101000111010001 (0xD7A651D1)
Key-word 30: 00000110111100101011111110110100 (0x06F2BFB4)
Key-word 31: 00100010010001000111011000110010 (0x22447632)
Key-word 32: 11110100111110011111101110001000 (0xF4F9F708)
Key-word 33: 00011010011101000100111110101100 (0x1A744FAC)
Key-word 34: 11101000000110010110100000101100 (0xE819682C)
Key-word 35: 11000100111111010010001101000011 (0xC4FD2343)
Key-word 36: 01101101010100101110100111110001 (0x6D52E9F1)
Key-word 37: 00111110001100101000010000011111 (0x3E32841F)
Key-word 38: 01110110111000000111101000111111 (0x76E07A3F)
Key-word 39: 01110011101100010011010101110101 (0x73B13575)
Key-word 40: 11101111101111110110011011111001 (0xEFBF66F9)
Key-word 41: 00111001110010001110001100101001 (0x39C8E329)
Key-word 42: 01111100100010011000010100011101 (0x7C89851D)
Key-word 43: 10011001000010011000001011110101 (0x990982F5)
Key-word 44: 01011101011100100011111000010100 (0x5D723E14)
Key-word 45: 01000100000010100000100101110111 (0x440A0977)
Key-word 46: 00010011111110100011011011110101 (0x13FA36F5)
Key-word 47: 01011010101001010010111000100000 (0x5AA52E20)
Key-word 48: 10100100100101001101110001111100 (0xA494DC7C)
Key-word 49: 10011010101100100111111010100010 (0x9AB27EA2)
Key-word 50: 00110110000111100000111100110101 (0x361E0F35)
Key-word 51: 01011010110100100110100000110001 (0x5AD26831)
Key-word 52: 00011011101010110110010111001101 (0x1BAB65CD)
Key-word 53: 11101101100010001110000010000010 (0xED88E082)
Key-word 54: 11001011100100101111100101011101 (0xCB92F95D)
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Key-word 55: 10100000100100001011010101111010 (0xA090B57A)
Key-word 56: 00100000101101000110010110101000 (0x20B465A8)
Key-word 57: 11101011100101000010101000010001 (0xEB942A11)
Key-word 58: 11110110111111001001101001111100 (0xF6FC9A7C)
Key-word 59: 01000011111101111110010110110110 (0x43F7E5B6)
Key-word 60: 01110001101001111111000111001111 (0x71A7F1CF)
Key-word 61: 10111111101001011111111011001101 (0xBFA5FECD)
Key-word 62: 01010011001001000011110011010110 (0x53243CD6)
Key-word 63: 10011011100011010010110101111011 (0x9B8D2D7B)
Key-word 64: 10001100001110111111011001010110 (0x8C3BF656)

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* OUTPUT KEY STREAM (SIZE: 256 Bytes) *
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** In Binary **

1000110010001010111001110001111011000001100111110110111000011110001001110110110001111001101100110011
0111111100000101110000101101011001111011010000011011010001010111010111001001000110011111101100111111011
1111001010111001101001111011101111010101010101011111101100000010001101100000000011101101110000010101111 0
0010101101001001001110111001011001000110000101100000100001010011101100100001001000111111010001100011 0
1110011000111111111000111111011000111010101111010001000100100011010100110000100000010010001001100011 0
0001101101011101001001110110000101011111101101001110010100100011110010101011111111101110001110100110
1001000010110101000000110111000011000110011101010100111000000101011101011101101100110001001110000111
1000001100100000000101010010100100000101110011011010100100010101101110001011011101010100110110000111 1
1011001001011001111111010010111100010101110110010011110100010000010010110100010010001000111011000110 1
0111010011001010001110100010000011011110010101111111101101000010001001000100011101100011001011110100
1111100111110111000010000001101001110100010011111010110011101000000110010110100000101100110001001111
1101001000110100001101101101010010111010011111000100111110001100101000010000011111011101101110000
0111101000111111011100111011000100110101011101011101111011111011111101100110111110010011100111001000111 0
0011001010010111110010001001100001010001110110011001000010011000001011110101010111010111001000111110
0001010001000100000010100000100101110111000100111111101000110110111101010101101010100101001011100010
0000101001001001010011011100011111001001101010110010011111101010001000110110000111100000111100110101
0101101011010010011010000011000100011011101010110110010111001101111011011000100011100000100000101100
1011100100101111100101011101101000001001000010110101011110100010000010110100011001011010100011101011
1001010000101010000100011111011011111100100110100111110001000011111101111110010110110110011100011010
0111111100011100111101111111010010111111111011001101010100110010010000111100110101101001101110001101
0010110101111011100011000011101111111011001010110

** In Hexadecimal **

0x8C8AE71EC19F6E1E276C79B337F05C2D6768368AEB9233ECFBF2B9A7B7AAAFB023600EDC15E2B493B9646160853B2123E8
C6E63FE3EC757A2246A610244C61B5D27615FB4E523CABFEE3A690B50370C6754E0575DB313878320152905CDA915B16EA9B
0FB259FD2F15D93D104B4491CED7A651D106F2BFB422447632F4F9F7081A744FACE819682CC4FD23436D52E9F13E32841F76
E07A3F73B13575EFBF66F939C8E3297C89851D990982F55D723E14440A097713FA36F55AA52E20A494DC7C9AB27EA2361E0F
355AD268311BAB65CDED88E082CB92F95DA090B57A20B465A8EB942A11F6FC9A7C43F7E5B671A7F1CFBFA5FECD53243CD69B
8D2D7B8C3BF656