**Praktikum. Algoritm AES**

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| 1. **Kasutades oma nime ees ja perekonnanime tähti täida ruut avateksti jaoks.**

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 | 1. **Kasutades oma tänava ja/või linna tähti täida ruut krüpteerimisvõtme jaoks**

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| 1. **Avatekst 16-nd süsteemis**

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 | 1. **Võti 16-nd süstemis**

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1. **Järgnevalt genereerige esimese kahe raundi jaoks alamvõtmeid kasutades KeyExpansion.**

Esimest neli elementi täitke oma krüpteerimisvõtme osadega (Iga osa 4 Baidi)

Konvertimise abiks on <http://home2.paulschou.net/tools/xlate/>



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| W0: |  |  |  |  |
| W1: |  |  |  |  |
| W2: |  |  |  |  |
| W3: |  |  |  |  |

Nk=4

R=10 raundi

Suurim indeks alamvõtme jaoks : (4\*(R+1)-1)=(4\*(10+1)-1)=43

W4 jaoks on n=4, kordne Nk-le

Teostage teisendust

T: T=Wi-1



**RotWord** nihutab (keerab, ehk > >) sisendsõna 1 Baidi võrra (8 bitt) vasakule

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| T=RotWord(T) |  |  |  |  |

**SubWord** teostab iga Baidiga teisendust tabeli abil, mis on sama mis protseduuris SubBytes (vaata p.7)

RCi/Nk kujutab endast sõnu, kus kõik Baidid peale esimest on nullid, ning esimene Bait on 2n-1 mod 256, kus n=i/Nk

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| T=SubWord(T) 16-nd süsteemis

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 | Ci kahendkoodi kujul

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| W4=:W4-4⊕T= W0⊕T

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| Järgmise W5 arvutamiseks vajame T: T=Wi-1=W4Antud juhul *i* ei ole kordne Nk-le ning ei ole Nk =8 või (i mod Nk)=4 |
| W5=:W5-4⊕T= W1⊕T

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| T=Wi-1=W5, *i* ei ole kordne Nk-le ning ei ole Nk =8 või (i mod Nk)=4W6=:W6-4⊕T= W2⊕T

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16-nd süsteemis:

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| W4: |  |  |  |  |
| W5: |  |  |  |  |
| W6: |  |  |  |  |
| W7: |  |  |  |  |

1. **Lisage alamvõtmed W0..W3 kasutades AddRoundKey**



Selles punktis kasutage XOR arvutamiseks kalkulaatorit

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 | W:W0 W1 W2 W3

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1. **Alustatakse raundidega. SubByte protseduuri teostame S-boxi abil**





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1. **ShiftRows. Esimene rida jääb muutmatul kujul. Teise rea nihutatud Baitide arv on 1, kolmanda – 2, neljanda – 3.**



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1. **MixColumns. Teostage korrutamist GF(28) korpuse siseselt.**





XOR teostamiseks kasutage kalkulaatorit

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1. **Lisage alamvõtmed W4..W7 kasutades AddRoundKey**



Selles punktis kasutage XOR arvutamiseks kalkulaatorit

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 | W:W4 W5 W6 W7

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Esimene raund on läbitud