# **CMSE456/CMPE455 Security of Computer Systems and Networks**

# Lab 2 Task. DES on Two Computers

March 27, 2025

Lab 2 aims getting understanding of DES in network environment. It supports the Term project

**Tasks**

1. Implement DES algorithm as a distributed application using two computers, each running a process able to create a message, encrypt it, send it, receive a message, decrypt it, and display it.
2. Test it by checking correctness of the particular transformations used:
   1. Initial permutation
   2. Inverse of the initial permutation
   3. Expansion/permutation
   4. Round key generation
      1. Permuted choice 1
      2. Left circular shifts schedule
      3. Permuted choice 2
   5. XOR with round key
   6. S-boxes
   7. Permutation P after S-boxes
   8. XOR with left half
   9. Swap of the halves
   10. Create a message, encrypt, and send it to the Receiver process
   11. Receive a message from the Sender process, decrypt, and display it
3. Prepare and print a report on the work done. It shall have
   1. Cover page (University, Department, Program, Course, Lab, Subject, Team members, Lecturer, Lab Assistant, Year, Semester, City, Country)
   2. Outline
   3. Problem definition
   4. Work done
      1. For the problems 1, 2 considered, show your work done by explaining your code developed and presenting screenshots of the running in step mode of the debugger DES cipher with the tested variables watched. Provide screenshots showing creation of a message, encryption of it, sending, receiving, decryption, displaying the message decrypted (shall be the same as the plaintext message)
      2. Describe settings of the distributed system (how you organize connection of the processes running on different machines)
   5. Conclusion
   6. References
   7. Appendix with source codes

# All related to the lab materials (sources, executables, test examples, report) shall be submitted via Teams assignment on Thursday, May 8, 2025. The assignment will be posted by Lab Coordinator ALI FARROKHNEJAD.

Grading policy: report – 50%, explanations – 50%