# ENCRYPTION METRICS

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **1** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0254510522 | -0.0130109261 | | 0.0047154250 | 7.9999789078 | 7.9999754523 | 7.9999658665 | 7.9999929042 | 99.6110186793 | 33.4368398491 |
| **2** | -0.0036835527 | -0.0355874579 | | -0.0110929998 | 7.9999774811 | 7.9999738645 | 7.9999652768 | 7.9999927027 | 99.6100541731 | 33.4396623850 |
| **3** | 0.0085767998 | -0.0040694656 | | -0.0287588730 | 7.9999749603 | 7.9999769939 | 7.9999716588 | 7.9999923350 | 99.6087721836 | 33.4360185059 |
| **4** | -0.0008975112 | -0.0253035353 | | 0.0762620585 | 7.9999772023 | 7.9999640857 | 7.9999278865 | 7.9999899233 | 99.6098693094 | 33.4438131184 |
| **5** | 0.0093308763 | -0.0042480715 | | -0.0182253555 | 7.9999786583 | 7.9999756753 | 7.9999721288 | 7.9999915048 | 99.6105806327 | 33.4433325832 |
| **6** | -0.0197183766 | -0.0002434546 | | -0.0297363947 | 7.9999784082 | 7.9999758871 | 7.9999733890 | 7.9999906838 | 99.6078559028 | 33.4302763846 |
| **7** | -0.0287170851 | 0.0295873063 | | 0.0419088481 | 7.9999776067 | 7.9999745942 | 7.9999429258 | 7.9999917744 | 99.6105766139 | 33.4402583458 |
| **8** | 0.0205877201 | 0.0188811482 | | -0.0142371236 | 7.9999801842 | 7.9999794335 | 7.9999757872 | 7.9999925578 | 99.6108378344 | 33.4429438494 |
| **9** | -0.0345791398 | -0.0029116238 | | -0.0144918655 | 7.9999793244 | 7.9999779213 | 7.9999775742 | 7.9999925325 | 99.6101747364 | 33.4420008712 |
| **10** | -0.0242371387 | -0.0348023368 | | -0.0002927251 | 7.9999785796 | 7.9999743572 | 7.9999691374 | 7.9999925097 | 99.6094473380 | 33.4407280383 |
| **11** | 0.0025401244 | 0.0121790185 | | -0.0277903748 | 7.9999779115 | 7.9999800823 | 7.9999681724 | 7.9999915093 | 99.6076228138 | 33.4475335119 |
| **12** | 0.0321897296 | 0.0144080397 | | -0.0001777990 | 7.9999800627 | 7.9999799184 | 7.9999711261 | 7.9999933355 | 99.6113803691 | 33.4393994783 |
| **13** | -0.0001202997 | -0.0283156820 | | -0.0662189751 | 7.9999779879 | 7.9999776126 | 7.9999716312 | 7.9999929266 | 99.6108900784 | 33.4386075273 |
| **14** | -0.0090489090 | 0.0070499995 | | 0.0038277952 | 7.9999800955 | 7.9999754263 | 7.9999709073 | 7.9999933305 | 99.6092463992 | 33.4437988400 |
| **15** | 0.0113726984 | 0.0066472313 | | 0.0103598362 | 7.9999765951 | 7.9999757400 | 7.9999734922 | 7.9999928834 | 99.6100541731 | 33.4396957015 |
| **16** | -0.0076687900 | -0.0122912570 | | 0.0011337740 | 7.9999779108 | 7.9999733460 | 7.9999693738 | 7.9999920637 | 99.6099577225 | 33.4424150100 |
| **17** | -0.0128091556 | 0.0024776791 | | -0.0383960158 | 7.9999803338 | 7.9999772446 | 7.9999741251 | 7.9999928732 | 99.6107574588 | 33.4469686454 |
| **18** | 0.0207695135 | -0.0146977300 | | 0.0192579411 | 7.9999804723 | 7.9999767881 | 7.9999721806 | 7.9999924935 | 99.6112999936 | 33.4380322593 |
| **19** | 0.0097148216 | 0.0006021897 | | 0.0010304371 | 7.9999782951 | 7.9999745794 | 7.9999762719 | 7.9999923883 | 99.6111673740 | 33.4431193201 |
| **20** | 0.0249180899 | 0.0223974041 | | -0.0109107881 | 7.9999779864 | 7.9999761723 | 7.9999709230 | 7.9999923614 | 99.6114125193 | 33.4380100063 |
| **21** | -0.0377140442 | 0.0176826224 | | -0.0283197152 | 7.9999786821 | 7.9999731052 | 7.9999776288 | 7.9999932324 | 99.6108177405 | 33.4462043373 |
| **22** | -0.0434891680 | -0.0137705634 | | -0.0190675972 | 7.9999779223 | 7.9999807046 | 7.9999775598 | 7.9999936170 | 99.6084707755 | 33.4280055242 |
| **23** | -0.0112888443 | 0.0272322787 | | -0.0208568530 | 7.9999758610 | 7.9999778216 | 7.9999789774 | 7.9999925574 | 99.6090133102 | 33.4442388723 |
| **24** | -0.0155709315 | 0.0096253327 | | -0.0095491928 | 7.9999766523 | 7.9999793609 | 7.9999770562 | 7.9999923538 | 99.6093910751 | 33.4361530167 |
| **25** | -0.0028048314 | 0.0112961016 | | -0.0023904157 | 7.9999777709 | 7.9999755361 | 7.9999786992 | 7.9999923036 | 99.6092584555 | 33.4367572672 |
| **26** | 0.0053233309 | -0.0133265481 | | -0.0353243312 | 7.9999767545 | 7.9999773484 | 7.9999759925 | 7.9999925631 | 99.6090052726 | 33.4432327757 |
| **27** | -0.0439311776 | 0.0075504473 | | 0.0218362381 | 7.9999739593 | 7.9999757094 | 7.9999802287 | 7.9999932826 | 99.6096281829 | 33.4435766095 |
| **28** | -0.0027591398 | 0.0025731115 | | -0.0085399301 | 7.9999765939 | 7.9999781365 | 7.9999777918 | 7.9999925972 | 99.6083502122 | 33.4322155621 |
| **29** | -0.0326668717 | 0.0105812098 | | -0.0290211091 | 7.9999769355 | 7.9999782601 | 7.9999759022 | 7.9999917157 | 99.6090695730 | 33.4277624749 |
| **30** | 0.0149461575 | -0.0179659024 | | -0.0169188566 | 7.9999720441 | 7.9999775208 | 7.9999738710 | 7.9999908847 | 99.6081131044 | 33.4347185344 |
| **31** | 0.0204085739 | 0.0059929770 | | -0.0293484778 | 7.9999787110 | 7.9999783596 | 7.9999780424 | 7.9999926729 | 99.6074218750 | 33.4397504514 |
| **32** | 0.4735273809 | 0.9978072851 | | -0.0379322276 | 7.6705088570 | 7.8270961236 | 7.8044727757 | 7.9790715798 | 99.6099215535 | 33.9293026747 |
| **33** | 0.0104888812 | -0.0218320686 | | 0.0215777051 | 7.9999713992 | 7.9999745648 | 7.9999738566 | 7.9999923171 | 99.6086797518 | 33.4462448402 |
| **34** | -0.0196780548 | 0.0068044017 | | 0.0104303603 | 7.9999765656 | 7.9999764893 | 7.9999774584 | 7.9999928195 | 99.6118786973 | 33.4402527668 |
| **35** | -0.7553033398 | 0.9401588289 | | -0.0361183406 | 7.9644087356 | 7.9835707732 | 7.9816550961 | 7.9962147515 | 99.6101506237 | 33.3170660384 |
| **36** | -0.0021582811 | -0.0193507597 | | -0.0324123867 | 7.9999735732 | 7.9999747152 | 7.9999781880 | 7.9999917536 | 99.6104359568 | 33.4411848706 |
| **37** | 0.0305383695 | 0.0076124188 | | -0.0439890786 | 7.9999730628 | 7.9999770673 | 7.9999779677 | 7.9999924452 | 99.6104721258 | 33.4330739568 |
| **38** | -0.0189932613 | 0.0312957136 | | -0.0231667609 | 7.9999767213 | 7.9999801350 | 7.9999773869 | 7.9999936020 | 99.6073093493 | 33.4388214365 |
| **39** | -0.0371756638 | 0.0001705737 | | 0.0042981550 | 7.9999823436 | 7.9999781423 | 7.9999751257 | 7.9999925579 | 99.6099215535 | 33.4363564456 |
| **40** | -0.0197042738 | 0.0009507401 | | 0.0175639229 | 7.9999830387 | 7.9999776827 | 7.9999761358 | 7.9999930378 | 99.6099818351 | 33.4388146755 |
| **41** | -0.4603955666 | 0.9968400122 | | -0.0085623705 | 7.9578801187 | 7.9473832943 | 7.9560843819 | 7.9733251626 | 99.6076951517 | 34.2598596801 |
| **42** | -0.0241915526 | 0.0046220026 | | -0.0134629870 | 7.9999756907 | 7.9999754294 | 7.9999759125 | 7.9999927154 | 99.6105565201 | 33.4340093229 |
| **43** | 0.0233164774 | 0.0389273405 | | -0.0489473574 | 7.9999768060 | 7.9999799793 | 7.9999724105 | 7.9999924304 | 99.6086234889 | 33.4421616853 |
| **44** | 0.0533888501 | -0.0203854668 | | -0.0316438989 | 7.9999760577 | 7.9999794922 | 7.9999768827 | 7.9999936045 | 99.6092463992 | 33.4378924847 |
| **45** | 0.0339937404 | 0.0016353265 | | 0.0100103767 | 7.9999756391 | 7.9999740595 | 7.9999728600 | 7.9999909156 | 99.6091740612 | 33.4329826755 |
| **46** | 0.0084714811 | -0.0054647283 | | -0.0607202811 | 7.9999823096 | 7.9999793669 | 7.9999745150 | 7.9999936704 | 99.6090776106 | 33.4415591369 |
| **47** | 0.0236570840 | 0.0257054470 | | -0.0035249425 | 7.9999733731 | 7.9999753951 | 7.9999751236 | 7.9999920693 | 99.6099135159 | 33.4484802882 |
| **48** | -0.0244692725 | -0.0009667430 | | -0.0193283057 | 7.9999765621 | 7.9999730018 | 7.9999754724 | 7.9999922660 | 99.6093307935 | 33.4441106970 |
| **49** | -0.9828629409 | 0.9951312044 | | -0.1919842741 | 7.9710287427 | 7.9756913167 | 7.9705799536 | 7.9899054471 | 99.6099617413 | 33.3229929919 |
| **50** | 0.0063419813 | 0.0324144901 | | -0.0372383029 | 7.9999767409 | 7.9999774259 | 7.9999742751 | 7.9999919614 | 99.6083703061 | 33.4362755027 |
| **Total** | -1.8576855447 | 3.9982955617 | | -0.8044844096 | 399.5627871888 | 399.7326614928 | 399.7115373631 | 399.9381684812 | 4980.4822169174 | 1673.0475118269 |
| **Average** | -0.0371366247 | 0.0797958975 | | -0.0160882999 | 7.9912557438 | 7.9946532299 | 7.9942307473 | 7.9987633696 | 99.6096443383 | 33.4609502365 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **2** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0068235864 | 0.0152500187 | | 0.0047955051 | 7.9999378154 | 7.9999345587 | 7.9998299712 | 7.9999234185 | 99.6091017233 | 33.4382719990 |
| **2** | 0.0068041301 | -0.0072525637 | | 0.0325140072 | 7.9999697694 | 7.9999743809 | 7.9999654843 | 7.9999862845 | 99.6097407086 | 33.4475632508 |
| **3** | -0.0239320701 | -0.0051305018 | | 0.0482563633 | 7.9999727780 | 7.9999643981 | 7.9999519958 | 7.9999783047 | 99.6087721836 | 33.4391447667 |
| **4** | 0.0194694570 | -0.0145648393 | | 0.0169180089 | 7.9999712177 | 7.9999710698 | 7.9999549807 | 7.9999833174 | 99.6079764660 | 33.4499031239 |
| **5** | 0.0128999783 | -0.0149551209 | | -0.0026453651 | 7.9999714397 | 7.9999719430 | 7.9999559551 | 7.9999826167 | 99.6109985854 | 33.4413171120 |
| **6** | 0.0091214105 | 0.0072064305 | | -0.0084989015 | 7.9999793380 | 7.9999765341 | 7.9999733333 | 7.9999917970 | 99.6098894033 | 33.4394675138 |
| **7** | 0.0161057012 | 0.0197072753 | | 0.0382482521 | 7.9999701464 | 7.9999718152 | 7.9999546983 | 7.9999821510 | 99.6099496849 | 33.4429325495 |
| **8** | -0.4532871738 | 0.9396170261 | | -0.0637188811 | 7.8833076732 | 7.8101046830 | 7.7071527399 | 7.8768473152 | 99.6065658758 | 33.1785789483 |
| **9** | 0.6616354746 | 0.9677458869 | | -0.0371221575 | 7.9646757579 | 7.9414353278 | 7.9303773392 | 7.9776846661 | 99.6074258938 | 33.4291225232 |
| **10** | -0.0071239448 | 0.0157568471 | | 0.0011447776 | 7.9999677441 | 7.9999714331 | 7.9999408102 | 7.9999777747 | 99.6086114326 | 33.4384089368 |
| **11** | -0.0018068038 | 0.0039204520 | | -0.0269191848 | 7.9999725896 | 7.9999764904 | 7.9999541949 | 7.9999851465 | 99.6087601273 | 33.4441239983 |
| **12** | 0.6122982024 | 0.5215223308 | | 0.0128033131 | 7.9933596619 | 7.9924331741 | 7.9888462199 | 7.9946960801 | 99.6101023984 | 33.3797367497 |
| **13** | -0.0014639962 | -0.0411736730 | | 0.0124425259 | 7.9999723142 | 7.9999732442 | 7.9999581591 | 7.9999836750 | 99.6102350180 | 33.4481981386 |
| **14** | -0.0259228985 | -0.0046697313 | | 0.0054774728 | 7.9999698339 | 7.9999759064 | 7.9999525282 | 7.9999831542 | 99.6097728588 | 33.4454363413 |
| **15** | -0.0152468117 | 0.0129595347 | | -0.0116559370 | 7.9999400335 | 7.9999544880 | 7.9998719611 | 7.9999439509 | 99.6080367477 | 33.4393510324 |
| **16** | 0.0729066718 | 0.0175215960 | | -0.0201607737 | 7.9999717587 | 7.9999763547 | 7.9999585677 | 7.9999850446 | 99.6103756752 | 33.4372298280 |
| **17** | -0.0200315462 | 0.0208022170 | | -0.0237755076 | 7.9999720706 | 7.9999753271 | 7.9999581879 | 7.9999859659 | 99.6079563722 | 33.4424915559 |
| **18** | -0.0058327625 | 0.0088398869 | | 0.0193849350 | 7.9999704707 | 7.9999704075 | 7.9999472508 | 7.9999800189 | 99.6101867927 | 33.4363833792 |
| **19** | -0.0120986294 | -0.0182728114 | | -0.0110143357 | 7.9999680744 | 7.9999763149 | 7.9999574989 | 7.9999831445 | 99.6091177984 | 33.4379481014 |
| **20** | 0.0210834017 | 0.0032275858 | | 0.0195573523 | 7.9999753811 | 7.9999742715 | 7.9999583444 | 7.9999847379 | 99.6080005787 | 33.4365326886 |
| **21** | 0.0135286847 | -0.0090096729 | | 0.0127032221 | 7.9999603585 | 7.9999519927 | 7.9999002553 | 7.9999559766 | 99.6096522955 | 33.4423728523 |
| **22** | -0.0026249841 | -0.0047902746 | | 0.0000824746 | 7.9999750850 | 7.9999676559 | 7.9999464468 | 7.9999796858 | 99.6098291217 | 33.4450394597 |
| **23** | 0.0201849236 | 0.0230821750 | | 0.0111530974 | 7.9999736374 | 7.9999720264 | 7.9999564823 | 7.9999832672 | 99.6100662294 | 33.4432577079 |
| **24** | 0.0131882954 | -0.0398479897 | | 0.0054349191 | 7.9999695228 | 7.9999632095 | 7.9999361128 | 7.9999729705 | 99.6105645576 | 33.4469743189 |
| **25** | -0.0071854310 | -0.0114496961 | | -0.0164975305 | 7.9999755916 | 7.9999767138 | 7.9999719538 | 7.9999887367 | 99.6115250450 | 33.4298607959 |
| **26** | -0.0431271004 | 0.1535309814 | | -0.0360480965 | 7.8721301987 | 7.8638976541 | 7.8205226167 | 7.8836743297 | 99.6076469264 | 33.1428848758 |
| **27** | -0.8378130017 | 0.9587062588 | | 0.0170441312 | 7.9496888682 | 7.9142867597 | 7.8541614495 | 7.9436449674 | 99.6073334619 | 33.2606527028 |
| **28** | -0.0199369857 | 0.0046612216 | | -0.0831130663 | 7.9999715487 | 7.9999735861 | 7.9999648524 | 7.9999873281 | 99.6101064172 | 33.4298958460 |
| **29** | -0.1857727860 | 0.1200039760 | | 0.0600035115 | 7.9895782741 | 7.9873175870 | 7.9711214223 | 7.9910853818 | 99.6116054205 | 33.5657385659 |
| **30** | 0.0030110187 | 0.0218928949 | | 0.0111797849 | 7.9999505237 | 7.9999505082 | 7.9998835937 | 7.9999486527 | 99.6090615355 | 33.4399546840 |
| **31** | 0.0291102627 | 0.9857510876 | | -0.1305660568 | 7.9349960889 | 7.9328901201 | 7.8057641513 | 7.9495087688 | 99.6078960905 | 33.0901132759 |
| **32** | 0.0186763001 | -0.0063458515 | | -0.0418817974 | 7.9999767972 | 7.9999743150 | 7.9999687090 | 7.9999899615 | 99.6101707176 | 33.4441996931 |
| **33** | -0.0327091525 | 0.0087123744 | | -0.0322809672 | 7.9999753347 | 7.9999745224 | 7.9999567387 | 7.9999842541 | 99.6092986433 | 33.4420078056 |
| **34** | -0.0036819373 | 0.0066424062 | | 0.0452696737 | 7.9999724325 | 7.9999631987 | 7.9999482520 | 7.9999791145 | 99.6109463413 | 33.4406987248 |
| **35** | 0.0212376762 | 0.0114765264 | | 0.0190821470 | 7.9999715514 | 7.9999718055 | 7.9999621440 | 7.9999835409 | 99.6081251608 | 33.8575069470 |
| **36** | -0.0013397972 | 0.0027077677 | | 0.0205441036 | 7.9999752712 | 7.9999724057 | 7.9999633717 | 7.9999870203 | 99.6105766139 | 33.4425354314 |
| **37** | 0.0039716261 | 0.0211122041 | | 0.0437757680 | 7.9999777184 | 7.9999747209 | 7.9999750640 | 7.9999912683 | 99.6120916924 | 33.4425164723 |
| **38** | 0.0192554548 | -0.0382284940 | | 0.0263030490 | 7.9999747934 | 7.9999666259 | 7.9999423647 | 7.9999787439 | 99.6092343428 | 33.4331847017 |
| **39** | -0.4465928054 | 0.7649686896 | | -0.0095731073 | 7.9135353529 | 7.8992210677 | 7.7904448419 | 7.9339336996 | 99.6123931006 | 33.4799074925 |
| **40** | -0.0085587873 | -0.0080221519 | | -0.0436060362 | 7.9999743494 | 7.9999776615 | 7.9999637600 | 7.9999881138 | 99.6102591307 | 33.4347423004 |
| **41** | -0.0003468870 | 0.0033741630 | | -0.0061571026 | 7.9999608374 | 7.9999631632 | 7.9999111863 | 7.9999632648 | 99.6100903421 | 33.4323492061 |
| **42** | -0.0290297488 | 0.0187252694 | | 0.0187557808 | 7.9999700958 | 7.9999730991 | 7.9999645166 | 7.9999847556 | 99.6081492734 | 33.4310812272 |
| **43** | 0.0273553480 | 0.0025770376 | | -0.0594555337 | 7.9999734648 | 7.9999734157 | 7.9999593011 | 7.9999851214 | 99.6090977045 | 33.4412024902 |
| **44** | 0.0262399562 | 0.0202755088 | | -0.0176929221 | 7.9999721489 | 7.9999743722 | 7.9999564597 | 7.9999840277 | 99.6102792245 | 33.4347636708 |
| **45** | 0.0047037763 | 0.0034876634 | | 0.0262021816 | 7.9999739451 | 7.9999820792 | 7.9999714088 | 7.9999903746 | 99.6092986433 | 33.4377412684 |
| **46** | -0.0144577717 | -0.0012193312 | | -0.0427871635 | 7.9999749603 | 7.9999769329 | 7.9999604534 | 7.9999855637 | 99.6101707176 | 33.4397437061 |
| **47** | -0.0005935369 | 0.0053919408 | | 0.0036223253 | 7.9999721526 | 7.9999698508 | 7.9999392486 | 7.9999760223 | 99.6085873200 | 33.4330582284 |
| **48** | -0.0159249797 | -0.0155521189 | | -0.0361839679 | 7.9999650850 | 7.9999764770 | 7.9999480203 | 7.9999813146 | 99.6106489519 | 33.4438145841 |
| **49** | 0.0092878703 | 0.0152933265 | | -0.0561259217 | 7.9999735862 | 7.9999766658 | 7.9999710248 | 7.9999892477 | 99.6080005787 | 33.4366055939 |
| **50** | 0.0018849788 | -0.0009530718 | | -0.0011076633 | 7.9999730741 | 7.9999757350 | 7.9999673206 | 7.9999871380 | 99.6089731224 | 33.4360399236 |
| **Total** | -0.5656581439 | 5.4650126670 | | -0.2858892944 | 399.5000085177 | 399.3403480499 | 398.8662237439 | 399.5502211766 | 4980.4732550476 | 1671.4125870899 |
| **Average** | -0.0113126803 | 0.1088670698 | | -0.0057177236 | 7.9900001704 | 7.9868069610 | 7.9773244749 | 7.9910044235 | 99.6094651010 | 33.4282517418 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **3** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0017029174 | -0.0005173783 | | -0.0025696744 | 7.9999752924 | 7.9999778897 | 7.9999767851 | 7.9999917830 | 99.6084788130 | 33.4370230265 |
| **2** | 0.0278583580 | 0.0356396493 | | 0.0253668039 | 7.9999768819 | 7.9999758236 | 7.9999811418 | 7.9999925284 | 99.6119630916 | 33.4352226623 |
| **3** | -0.0001820233 | 0.0255932488 | | 0.0137173637 | 7.9999690610 | 7.9999724634 | 7.9999769091 | 7.9999896717 | 99.6109182099 | 33.4396540953 |
| **4** | -0.0192073878 | 0.0103284721 | | -0.0328676256 | 7.9999587190 | 7.9999769059 | 7.9999742693 | 7.9999879292 | 99.6100180041 | 33.4437646094 |
| **5** | -0.0273016716 | -0.0327300329 | | -0.0498155777 | 7.9999464612 | 7.9999721149 | 7.9999759882 | 7.9999814599 | 99.6115170075 | 33.4351905278 |
| **6** | 0.8213148389 | 1.0000000000 | | 0.0572961413 | 7.9694751888 | 7.9576311373 | 7.9267503076 | 7.9751075256 | 99.6298627186 | 34.0543321930 |
| **7** | 0.4694265405 | 0.9941602096 | | -0.0832316804 | 7.7994761190 | 7.7407311369 | 7.7458064471 | 7.7865815905 | 99.6106730646 | 33.3375098342 |
| **8** | 0.0059726981 | 0.0059827297 | | 0.0045447313 | 7.9999723916 | 7.9999733383 | 7.9999794776 | 7.9999909183 | 99.6082939493 | 33.4400485027 |
| **9** | -0.0135810008 | 0.0073564567 | | -0.0134522252 | 7.9999694842 | 7.9999774532 | 7.9999811174 | 7.9999910293 | 99.6095036008 | 33.4408085556 |
| **10** | -0.0348684486 | 0.0031592227 | | -0.0080413602 | 7.9999774087 | 7.9999789989 | 7.9999739506 | 7.9999920848 | 99.6095679012 | 33.4392065771 |
| **11** | 0.0090446097 | -0.0151858669 | | -0.0042651371 | 7.9999769178 | 7.9999766991 | 7.9999783289 | 7.9999925602 | 99.6072088799 | 33.4373448122 |
| **12** | 0.0285905141 | 0.0076163584 | | -0.0521177416 | 7.9999720682 | 7.9999773962 | 7.9999792036 | 7.9999912885 | 99.6084587191 | 33.4369060250 |
| **13** | 0.0060632764 | -0.0166570574 | | -0.0192622275 | 7.9999752839 | 7.9999743567 | 7.9999765326 | 7.9999910049 | 99.6098050090 | 33.4412428040 |
| **14** | 0.0260417039 | 0.0117408726 | | -0.0275493413 | 7.9999721497 | 7.9999775207 | 7.9999778968 | 7.9999913613 | 99.6092102302 | 33.4309705139 |
| **15** | -0.0383452314 | 0.0327543756 | | -0.0293357334 | 7.9999734329 | 7.9999796574 | 7.9999785609 | 7.9999921707 | 99.6080005787 | 33.4362030859 |
| **16** | -0.0164988373 | -0.0098260404 | | -0.0009784366 | 7.9999691850 | 7.9999757537 | 7.9999776839 | 7.9999895325 | 99.6097648212 | 33.4391975309 |
| **17** | 0.0085695986 | -0.0375534120 | | 0.0255193752 | 7.9999759860 | 7.9999778568 | 7.9999759368 | 7.9999922900 | 99.6096924833 | 33.4339881101 |
| **18** | -0.0092130201 | -0.0339261433 | | -0.0353921209 | 7.9999723083 | 7.9999747639 | 7.9999775725 | 7.9999913903 | 99.6093106996 | 33.4394477666 |
| **19** | 0.0105563520 | 0.0023484008 | | 0.0169755920 | 7.9999759027 | 7.9999784652 | 7.9999739933 | 7.9999924174 | 99.6077353395 | 33.4376898438 |
| **20** | 0.0000731411 | -0.0234742529 | | 0.0303493841 | 7.9999741203 | 7.9999798040 | 7.9999765035 | 7.9999914094 | 99.6088686343 | 33.4377890997 |
| **21** | -0.0150250859 | -0.0126323305 | | 0.0093616265 | 7.9999782376 | 7.9999794467 | 7.9999777636 | 7.9999924245 | 99.6107654964 | 33.3452083901 |
| **22** | -0.0172468267 | 0.0301694701 | | -0.0388719511 | 7.9999765598 | 7.9999810683 | 7.9999795697 | 7.9999923005 | 99.6093468686 | 33.4366465854 |
| **23** | 0.8796914160 | 1.0000000000 | | 0.0995388739 | 7.9515161434 | 7.9609660392 | 7.9274270345 | 7.9752831075 | 99.6107534401 | 33.8696555957 |
| **24** | 0.0116001787 | 0.0106361725 | | 0.0342485250 | 7.9999783401 | 7.9999776027 | 7.9999779747 | 7.9999922451 | 99.6102912809 | 33.4421055958 |
| **25** | 0.0164453020 | -0.0360544537 | | 0.0183211386 | 7.9999777723 | 7.9999744625 | 7.9999774605 | 7.9999926809 | 99.6093026620 | 33.4338651986 |
| **26** | -0.0063698258 | -0.0016410893 | | -0.0458697598 | 7.9999755370 | 7.9999747434 | 7.9999740968 | 7.9999908102 | 99.6095156572 | 33.4376187667 |
| **27** | -0.0220769881 | 0.0127632204 | | 0.0163849872 | 7.9999760767 | 7.9999744228 | 7.9999777816 | 7.9999910292 | 99.6098532343 | 33.4443876300 |
| **28** | -0.0010903887 | -0.0237322905 | | 0.0423111290 | 7.9999774051 | 7.9999781063 | 7.9999728267 | 7.9999918018 | 99.6085270383 | 33.4391087238 |
| **29** | 0.0181623762 | -0.0167333188 | | 0.0209174729 | 7.9999766582 | 7.9999795892 | 7.9999807831 | 7.9999933372 | 99.6080849730 | 33.4400395826 |
| **30** | -0.0233313442 | 0.0332168282 | | -0.0371385796 | 7.9999797665 | 7.9999812273 | 7.9999780451 | 7.9999931192 | 99.6087842400 | 33.4392477104 |
| **31** | 0.0235110735 | 0.0314952109 | | 0.0208449125 | 7.9999788956 | 7.9999736540 | 7.9999771905 | 7.9999930184 | 99.6118063593 | 33.4377533878 |
| **32** | 0.0102126010 | 0.0023352743 | | -0.0076967817 | 7.9999803930 | 7.9999796165 | 7.9999800593 | 7.9999933501 | 99.6106610082 | 33.4419560028 |
| **33** | -0.0053185208 | -0.0071164622 | | -0.0060540423 | 7.9999768946 | 7.9999723460 | 7.9999747897 | 7.9999919322 | 99.6123087063 | 33.4401985685 |
| **34** | 0.0492865139 | -0.0113611996 | | -0.0524172402 | 7.9999787642 | 7.9999768363 | 7.9999808214 | 7.9999933852 | 99.6091901363 | 33.4398437973 |
| **35** | 0.0055361911 | 0.0033056631 | | 0.0133262331 | 7.9999780204 | 7.9999789050 | 7.9999795138 | 7.9999931156 | 99.6101626800 | 33.4432130128 |
| **36** | -0.0166112233 | 0.0230162881 | | -0.0010533924 | 7.9999758323 | 7.9999757534 | 7.9999783818 | 7.9999919112 | 99.6108338156 | 33.4362804040 |
| **37** | -0.0325194786 | 0.0370232022 | | -0.2370433642 | 7.9693506007 | 7.9680414257 | 7.9567434631 | 7.9790266025 | 99.6082738555 | 33.0518319629 |
| **38** | -0.0170264546 | -0.0121128066 | | 0.0292802075 | 7.9999774543 | 7.9999743272 | 7.9999708921 | 7.9999914483 | 99.6102912809 | 33.4423813468 |
| **39** | -0.0203219726 | 0.0022113594 | | 0.0176177849 | 7.9999720090 | 7.9999749453 | 7.9999776003 | 7.9999918373 | 99.6096161265 | 33.4475788216 |
| **40** | -0.0103677064 | 0.0049076588 | | -0.0230207352 | 7.9999772368 | 7.9999766969 | 7.9999730453 | 7.9999920325 | 99.6112115805 | 33.4426201567 |
| **41** | -0.0047888033 | 0.0179577569 | | -0.0077594741 | 7.9999720153 | 7.9999781834 | 7.9999749426 | 7.9999913080 | 99.6083060057 | 33.4396434416 |
| **42** | -0.2665330161 | 1.0000000000 | | 0.2570081984 | 7.9201789266 | 7.8971003576 | 7.8640161530 | 7.9403253444 | 99.6499164095 | 35.8849219002 |
| **43** | -0.0190587797 | 0.0039706821 | | -0.0113385740 | 7.9999742455 | 7.9999757932 | 7.9999767173 | 7.9999913441 | 99.6076147762 | 33.4343090133 |
| **44** | -0.0169401202 | -0.0162584155 | | -0.0223324886 | 7.9999748440 | 7.9999795721 | 7.9999784412 | 7.9999919066 | 99.6077273020 | 33.4327831551 |
| **45** | -0.0366889554 | -0.0124441917 | | 0.0060043109 | 7.9999778822 | 7.9999785245 | 7.9999783728 | 7.9999929080 | 99.6090052726 | 33.4388788498 |
| **46** | 0.0021403000 | 0.0306612644 | | 0.0015699104 | 7.9999749566 | 7.9999762233 | 7.9999732601 | 7.9999904468 | 99.6089369534 | 33.4432210818 |
| **47** | -0.0279950453 | 0.0151067682 | | 0.0072484369 | 7.9999724199 | 7.9999768758 | 7.9999771177 | 7.9999908928 | 99.6090856481 | 33.8440405023 |
| **48** | -0.0105481934 | 0.0202356407 | | 0.0518600519 | 7.9999752199 | 7.9999784991 | 7.9999744286 | 7.9999912311 | 99.6104761445 | 33.4412930151 |
| **49** | -0.0063895043 | -0.0129338224 | | -0.0663664866 | 7.9999782747 | 7.9999804316 | 7.9999656749 | 7.9999903873 | 99.6095076196 | 33.6373360497 |
| **50** | -0.0019395464 | 0.0339478485 | | 0.0348452993 | 7.9999764358 | 7.9999754807 | 7.9999650241 | 7.9999911675 | 99.6095920139 | 33.4384241451 |
| **Total** | 1.6944151008 | 4.1167497406 | | -0.0613832611 | 399.6088481807 | 399.5234306915 | 399.4196878329 | 399.6559403721 | 4980.5386003408 | 1675.4599325704 |
| **Average** | 0.0338753353 | 0.0821494469 | | -0.0012276646 | 7.9921769636 | 7.9904686138 | 7.9883937567 | 7.9931188074 | 99.6107720068 | 33.5091986514 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **4** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0090018060 | -0.0192882625 | | 0.0587324634 | 7.9993661378 | 7.9997493802 | 7.9980042847 | 7.9992012058 | 99.6098291217 | 33.4321483303 |
| **2** | -0.0036145720 | -0.0124454344 | | 0.0424666818 | 7.9995006190 | 7.9998113960 | 7.9984504184 | 7.9993853580 | 99.6096563143 | 33.4445060657 |
| **3** | -0.0280371479 | 0.0014329680 | | 0.0515443731 | 7.9994675096 | 7.9998099134 | 7.9983232458 | 7.9993466811 | 99.6081211420 | 33.4506439812 |
| **4** | 0.0223660077 | 0.0147241923 | | -0.0229859260 | 7.9971519662 | 7.9989300884 | 7.9906674584 | 7.9963124244 | 99.6075102881 | 33.4454610371 |
| **5** | 0.0081264790 | 0.0132197767 | | 0.0437140468 | 7.9994173589 | 7.9997834822 | 7.9981717209 | 7.9992818510 | 99.6089007845 | 33.4373491304 |
| **6** | -0.0318434339 | 0.0049480495 | | 0.0223136260 | 7.9998688836 | 7.9999401379 | 7.9995988056 | 7.9998469327 | 99.6070923354 | 33.4387523136 |
| **7** | 0.0160673869 | 0.0279633091 | | -0.0333926151 | 7.9995895164 | 7.9998370569 | 7.9986441022 | 7.9994770642 | 99.6084064751 | 33.4383581111 |
| **8** | -0.0195146450 | 0.0006799967 | | -0.0005273002 | 7.9995227354 | 7.9998234681 | 7.9984132205 | 7.9993943440 | 99.6096884645 | 33.4490742317 |
| **9** | -0.0300990748 | -0.0045239605 | | 0.0599771331 | 7.9994162697 | 7.9997681157 | 7.9982188290 | 7.9992792703 | 99.6077996399 | 33.4358331064 |
| **10** | -0.0191221305 | -0.0086709450 | | -0.0000691455 | 7.9995307868 | 7.9998399356 | 7.9985070436 | 7.9994258640 | 99.6077674897 | 33.4400776585 |
| **11** | 0.0185997650 | 0.0438532995 | | 0.0337250612 | 7.9993015966 | 7.9997431164 | 7.9977806067 | 7.9991303525 | 99.6092062114 | 33.4412077540 |
| **12** | 0.0094470732 | 0.0084452822 | | -0.0026623906 | 7.9996331355 | 7.9998735285 | 7.9988177595 | 7.9995554596 | 99.6090615355 | 33.4547248510 |
| **13** | 0.0134133931 | -0.0030097357 | | 0.0442179024 | 7.9994788407 | 7.9998329464 | 7.9983338563 | 7.9993674176 | 99.6099416474 | 33.4471558888 |
| **14** | -0.9714068822 | 0.9899394352 | | -0.3503500606 | 7.5962844980 | 7.8301350330 | 7.0240333414 | 7.5279516673 | 99.6113040123 | 34.2082373082 |
| **15** | -0.0144047428 | -0.0179986759 | | -0.0118406597 | 7.9996179420 | 7.9998687257 | 7.9987978858 | 7.9995408755 | 99.6077232832 | 33.4397640049 |
| **16** | 0.2543188101 | 0.9843145785 | | -0.1956164563 | 7.5780169435 | 7.8373033227 | 6.9901098487 | 7.5126502950 | 99.6063970872 | 33.3593475147 |
| **17** | 0.0000987057 | 0.0061450425 | | 0.0120417099 | 7.9980001244 | 7.9993507229 | 7.9937881106 | 7.9975541833 | 99.6073414995 | 33.4359780030 |
| **18** | 0.0197651835 | 0.0027027028 | | 0.0273499116 | 7.9995299029 | 7.9998324114 | 7.9983053093 | 7.9993821536 | 99.6098652906 | 33.4357361515 |
| **19** | -0.0319136199 | -0.0225689467 | | 0.0335175718 | 7.9994721278 | 7.9997963076 | 7.9983895014 | 7.9993525931 | 99.6090293853 | 33.4348325258 |
| **20** | -0.0058024834 | 0.0052739852 | | 0.0646600112 | 7.9976103449 | 7.9991594376 | 7.9925800226 | 7.9970307341 | 99.6079644097 | 33.4330910091 |
| **21** | 0.0389593396 | 0.0191975524 | | 0.0608396242 | 7.9978648935 | 7.9992597381 | 7.9933341901 | 7.9973493947 | 99.6092383616 | 33.4474007347 |
| **22** | -0.0067453533 | -0.0068548966 | | 0.0276678986 | 7.9971572060 | 7.9990447526 | 7.9916443996 | 7.9965948167 | 99.6091941551 | 33.4434604748 |
| **23** | -0.0405138993 | -0.0132807318 | | -0.0154135870 | 7.9971286512 | 7.9990046033 | 7.9916697344 | 7.9965604156 | 99.6097286523 | 33.4469195217 |
| **24** | 0.0122819695 | 0.0036355696 | | 0.0172671048 | 7.9995135712 | 7.9998190926 | 7.9985916828 | 7.9994283253 | 99.6097125772 | 33.4398827243 |
| **25** | -0.0060005102 | 0.0146003933 | | 0.0130203270 | 7.9993199186 | 7.9997766046 | 7.9980654510 | 7.9992160265 | 99.6084064751 | 33.4389660967 |
| **26** | 0.0343933216 | -0.0162486413 | | -0.0660889897 | 7.9976225480 | 7.9992286445 | 7.9931747931 | 7.9972051349 | 99.6068552276 | 33.4385230700 |
| **27** | -0.0051633068 | -0.0116267692 | | 0.0399420180 | 7.9982425849 | 7.9994452287 | 7.9950455910 | 7.9979690026 | 99.6064372749 | 33.4440343875 |
| **28** | 0.0047788164 | 0.0154063284 | | 0.0127360128 | 7.9995019542 | 7.9998111353 | 7.9985802324 | 7.9994150242 | 99.6087802212 | 33.6822517941 |
| **29** | 0.0018178559 | -0.0301652976 | | -0.0416247567 | 7.9998540169 | 7.9999344523 | 7.9996491604 | 7.9998506766 | 99.6088646155 | 33.4357961494 |
| **30** | -0.0081335120 | -0.0060048076 | | 0.0490867951 | 7.9987414332 | 7.9995885251 | 7.9964021926 | 7.9985300727 | 99.6095076196 | 33.4401537158 |
| **31** | 0.0021430678 | -0.0122345362 | | -0.0584574752 | 7.9995283038 | 7.9998425807 | 7.9984884161 | 7.9994231417 | 99.6071365419 | 33.4337212476 |
| **32** | 0.0001274919 | -0.0045941894 | | 0.0067213675 | 7.9995352088 | 7.9998546522 | 7.9987781488 | 7.9994983551 | 99.6081693673 | 33.4368584931 |
| **33** | 0.0495290374 | 0.0171912452 | | 0.0097445981 | 7.9992431824 | 7.9997572406 | 7.9981656879 | 7.9991980280 | 99.6075183256 | 33.4437368405 |
| **34** | -0.0112290443 | 0.0102250199 | | 0.0157160837 | 7.9992915714 | 7.9997365338 | 7.9980179227 | 7.9991719540 | 99.6094232253 | 33.4433646703 |
| **35** | -0.0105684921 | 0.0046545046 | | -0.0246899624 | 7.9995026057 | 7.9998024358 | 7.9986357991 | 7.9994232687 | 99.6093307935 | 33.4328505917 |
| **36** | 0.0104475998 | 0.0162793081 | | 0.0571112114 | 7.9995000113 | 7.9998131358 | 7.9986472607 | 7.9994291546 | 99.6107936278 | 33.4436485377 |
| **37** | 0.0293210055 | -0.0006057232 | | -0.0358094593 | 7.9968128902 | 7.9988510229 | 7.9911905706 | 7.9962508375 | 99.6085431134 | 33.4377555469 |
| **38** | -0.0016984524 | 0.0117632137 | | 0.0367118076 | 7.9996324867 | 7.9998362124 | 7.9988264226 | 7.9995311166 | 99.6081814236 | 33.4355015023 |
| **39** | -0.9457568563 | 0.9874304992 | | -0.6707970727 | 7.3104686823 | 7.6768509479 | 6.6456995969 | 7.2504772525 | 99.6082818930 | 33.0509142006 |
| **40** | 0.0109953609 | -0.0170565893 | | -0.0235415895 | 7.9992524402 | 7.9997000579 | 7.9980563549 | 7.9991409873 | 99.6092504180 | 33.3217444134 |
| **41** | 0.0263353400 | 0.0011150111 | | -0.0692417602 | 7.9992832855 | 7.9997137691 | 7.9982205627 | 7.9991999815 | 99.6080608603 | 33.4398770034 |
| **42** | -0.0046965120 | -0.0262241652 | | -0.0050462005 | 7.9997041632 | 7.9998611101 | 7.9992671390 | 7.9996709578 | 99.6099456662 | 33.4448241636 |
| **43** | 0.0000858169 | 0.0186938505 | | -0.0254030492 | 7.9992738705 | 7.9997166168 | 7.9982119469 | 7.9991944393 | 99.6087681649 | 33.4397315710 |
| **44** | -0.9611660192 | 0.6764094999 | | -0.1312607240 | 7.6410699310 | 7.8488330797 | 7.2479657449 | 7.6091855057 | 99.6105203511 | 33.0364550868 |
| **45** | 0.0503709413 | 0.0241156685 | | 0.0219581916 | 7.9979199659 | 7.9992347290 | 7.9948188352 | 7.9976743499 | 99.6081131044 | 33.4383743595 |
| **46** | -0.0126763836 | 0.0047392811 | | 0.0072834710 | 7.9993958773 | 7.9997680341 | 7.9984790814 | 7.9993275240 | 99.6093709812 | 33.4305290632 |
| **47** | 0.0065929622 | -0.0041632086 | | -0.0441726998 | 7.9982621393 | 7.9993245102 | 7.9957331169 | 7.9980513996 | 99.6082055363 | 33.4373753549 |
| **48** | 0.0024848494 | 0.0137883222 | | -0.0300757610 | 7.9991027768 | 7.9996570197 | 7.9979489091 | 7.9990389003 | 99.6099697788 | 33.4407054543 |
| **49** | 0.0166654953 | -0.0173986638 | | 0.0242614641 | 7.9994228641 | 7.9997515100 | 7.9985449838 | 7.9993457707 | 99.6089490098 | 33.4390018559 |
| **50** | -0.0337724151 | 0.0065876709 | | 0.0107860539 | 7.9993564413 | 7.9997579645 | 7.9986120888 | 7.9993393024 | 99.6082055363 | 33.4417392095 |
| **Total** | -2.5533482189 | 3.6945113763 | | -0.9539531195 | 398.0802827153 | 399.1767644669 | 395.7764013874 | 397.8461578441 | 4980.4360693158 | 1672.0283768125 |
| **Average** | -0.0510226192 | 0.0737560461 | | -0.0190767477 | 7.9616056543 | 7.9835352893 | 7.9155280277 | 7.9569231569 | 99.6087213863 | 33.4405675362 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **5** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0237276505 | 0.0053372736 | | -0.0144358784 | 7.9999535906 | 7.9999579722 | 7.9999538319 | 7.9999687286 | 99.6090735918 | 33.4479968058 |
| **2** | 0.0142844688 | -0.0221904867 | | 0.0060701485 | 7.9999423073 | 7.9999647071 | 7.9999501610 | 7.9999680146 | 99.6106127829 | 33.4421368319 |
| **3** | -0.0066111559 | -0.0229031284 | | 0.0283909562 | 7.9999642239 | 7.9999689533 | 7.9999666456 | 7.9999814669 | 99.6100059478 | 33.4324974910 |
| **4** | -0.0064745806 | -0.0131554750 | | -0.0104037999 | 7.9999471189 | 7.9999694047 | 7.9999637092 | 7.9999750166 | 99.6072329925 | 33.4397457076 |
| **5** | 0.0107755024 | -0.0025591380 | | 0.0358960229 | 7.9999422624 | 7.9999654378 | 7.9999463290 | 7.9999666811 | 99.6097808963 | 33.4389532996 |
| **6** | 0.0347927227 | 0.0008333813 | | 0.0124225550 | 7.9999319154 | 7.9999554967 | 7.9999433466 | 7.9999600954 | 99.6099376286 | 33.6660379883 |
| **7** | -0.0067004733 | 0.0164467832 | | -0.0201025867 | 7.9999428932 | 7.9999702506 | 7.9999433223 | 7.9999689183 | 99.6070159787 | 33.4440758676 |
| **8** | -0.0157551113 | -0.0113210434 | | 0.0009391250 | 7.9999473459 | 7.9999681430 | 7.9999478649 | 7.9999693655 | 99.6106690458 | 33.4406172461 |
| **9** | 0.0100251116 | 0.0002509503 | | 0.0262217447 | 7.9998385993 | 7.9999452105 | 7.9998598312 | 7.9999022156 | 99.6096723894 | 33.4405015527 |
| **10** | 0.0016946444 | -0.0055188806 | | -0.0167222897 | 7.9999596689 | 7.9999753301 | 7.9999564156 | 7.9999798647 | 99.6076067387 | 33.4464157564 |
| **11** | 0.0203268660 | 0.0135704177 | | -0.0477399043 | 7.9999576583 | 7.9999736079 | 7.9999557875 | 7.9999758684 | 99.6099778164 | 33.4337234225 |
| **12** | 0.0000202772 | -0.0186643983 | | 0.0013496096 | 7.9999666121 | 7.9999761713 | 7.9999747952 | 7.9999889776 | 99.6106328768 | 33.4395011297 |
| **13** | 0.0107944066 | -0.0000825261 | | 0.0054174107 | 7.9999301789 | 7.9999677086 | 7.9999357182 | 7.9999629095 | 99.6118907536 | 33.4343293120 |
| **14** | 0.0241496231 | 0.0126399466 | | -0.0669029528 | 7.9999519510 | 7.9999713759 | 7.9999543313 | 7.9999748145 | 99.6093026620 | 33.4410689723 |
| **15** | -0.0118440311 | -0.0211208444 | | -0.0026914541 | 7.9998652609 | 7.9999487368 | 7.9998810070 | 7.9999191979 | 99.6095036008 | 33.4390000435 |
| **16** | 0.4810134426 | 0.9801518903 | | 0.1568972069 | 7.9896650803 | 7.9900015868 | 7.9902882875 | 7.9909998734 | 99.6085270383 | 33.4349774381 |
| **17** | 0.0238882847 | 0.0106626630 | | 0.0146314351 | 7.9998549066 | 7.9999455149 | 7.9998740080 | 7.9999106426 | 99.6110548483 | 33.4481618750 |
| **18** | 0.1487754288 | 0.9778240197 | | -0.0369965422 | 7.9705223539 | 7.9748807086 | 7.9759098232 | 7.9754093597 | 99.6108217593 | 33.9453666195 |
| **19** | -0.0103364229 | 0.0064561058 | | -0.0251512873 | 7.9999585923 | 7.9999697233 | 7.9999600621 | 7.9999770320 | 99.6098532343 | 33.4400079052 |
| **20** | -0.0121244902 | 0.0404463382 | | 0.0202432664 | 7.9998603319 | 7.9999438783 | 7.9998296235 | 7.9999002761 | 99.6072852366 | 33.4423493542 |
| **21** | 0.0070011421 | 0.0039499290 | | 0.0154943022 | 7.9999488800 | 7.9999585425 | 7.9999278828 | 7.9999625405 | 99.6088324653 | 33.4441080493 |
| **22** | -0.0143541804 | 0.0033892599 | | 0.0167810468 | 7.9999436470 | 7.9999527742 | 7.9999416795 | 7.9999605582 | 99.6069878472 | 34.2943854079 |
| **23** | 0.0316959783 | 0.0217504310 | | 0.0390073233 | 7.9999555208 | 7.9999651832 | 7.9999461452 | 7.9999709969 | 99.6081573110 | 33.4399846278 |
| **24** | 0.0069458409 | -0.0118416881 | | -0.0035900024 | 7.9999659759 | 7.9999698215 | 7.9999617616 | 7.9999813865 | 99.6090133102 | 33.4353178048 |
| **25** | 0.0081032794 | 0.0261574050 | | 0.0142265777 | 7.9999559645 | 7.9999528329 | 7.9999320071 | 7.9999613022 | 99.6089208783 | 33.4413718146 |
| **26** | -0.3510063007 | -0.1617683545 | | 0.0826753388 | 7.9729581814 | 7.9753352208 | 7.9762554198 | 7.9769010889 | 99.6102028678 | 33.4896943619 |
| **27** | -0.0014340415 | 0.0102453757 | | -0.0204641599 | 7.9999659999 | 7.9999733115 | 7.9999677017 | 7.9999831001 | 99.6093348122 | 33.4341142366 |
| **28** | 0.0236684335 | 0.0121443766 | | -0.0623008769 | 7.9999573364 | 7.9999589547 | 7.9999605418 | 7.9999758491 | 99.6079523534 | 33.4426769396 |
| **29** | -0.2700775565 | 0.1802408402 | | -0.0475216080 | 7.9488289046 | 7.9493369812 | 7.9478201040 | 7.9520433272 | 99.6111312050 | 33.3131899529 |
| **30** | 0.0216910095 | -0.0248704886 | | -0.0062665007 | 7.9999504049 | 7.9999635468 | 7.9999484710 | 7.9999689117 | 99.6078800154 | 33.4380052941 |
| **31** | 0.0196485884 | 0.0230727564 | | 0.0186293015 | 7.9999581058 | 7.9999613606 | 7.9999502857 | 7.9999733981 | 99.6088565779 | 33.4363343502 |
| **32** | -0.0016037108 | 0.0011850188 | | -0.0583061397 | 7.9999566257 | 7.9999615459 | 7.9999515190 | 7.9999721571 | 99.6091258359 | 33.4443291450 |
| **33** | -0.8575514029 | 0.9848927692 | | -0.0435644622 | 7.9741090478 | 7.9747531280 | 7.9738206300 | 7.9760016599 | 99.6110749421 | 32.0623905002 |
| **34** | -0.0180299053 | 0.0260217780 | | 0.0205896401 | 7.9999523487 | 7.9999510528 | 7.9999448276 | 7.9999626168 | 99.6094754694 | 33.4387132605 |
| **35** | -0.0008976729 | -0.0272217241 | | -0.0148095891 | 7.9999646050 | 7.9999623862 | 7.9999551603 | 7.9999764555 | 99.6099456662 | 33.4360752101 |
| **36** | 0.0000397466 | -0.0101779258 | | -0.0167950078 | 7.9999624471 | 7.9999556229 | 7.9999553511 | 7.9999730232 | 99.6096764082 | 33.4402642400 |
| **37** | 0.3251487680 | 0.9626593998 | | 0.0717026105 | 7.9688140629 | 7.9691886689 | 7.9666254949 | 7.9708114171 | 99.6080367477 | 33.6130724943 |
| **38** | 0.0046193895 | 0.0171102177 | | -0.0350450689 | 7.9999580789 | 7.9999527520 | 7.9999521193 | 7.9999704160 | 99.6074339313 | 33.4417806738 |
| **39** | -0.0024349186 | 0.0087643671 | | 0.0069582617 | 7.9999604689 | 7.9999561093 | 7.9999516699 | 7.9999702706 | 99.6083863812 | 33.4466004310 |
| **40** | -0.0240850333 | -0.0116150174 | | 0.0593676996 | 7.9999692355 | 7.9999626785 | 7.9999692092 | 7.9999811198 | 99.6109784915 | 33.6980622724 |
| **41** | -0.0007817339 | 0.0075150280 | | 0.0186807265 | 7.9999640176 | 7.9999577420 | 7.9999623367 | 7.9999770299 | 99.6093950939 | 33.4335090090 |
| **42** | -0.0152633025 | -0.0086737398 | | -0.0037197315 | 7.9999363661 | 7.9999287779 | 7.9999295484 | 7.9999458898 | 99.6107454025 | 33.4370784856 |
| **43** | -0.0082669532 | 0.0213451736 | | 0.0055605850 | 7.9999674945 | 7.9999674818 | 7.9999677560 | 7.9999823409 | 99.6094634131 | 33.4421803293 |
| **44** | 0.0266584787 | 0.0036912774 | | 0.0310891176 | 7.9999595627 | 7.9999552385 | 7.9999573603 | 7.9999730239 | 99.6098130466 | 33.4382856628 |
| **45** | 0.0047248831 | -0.0375414027 | | 0.0152223640 | 7.9999677130 | 7.9999677095 | 7.9999667831 | 7.9999839196 | 99.6087480710 | 33.4417542918 |
| **46** | -0.0014372918 | 0.0392942641 | | -0.0185449153 | 7.9999636147 | 7.9999644961 | 7.9999591273 | 7.9999760514 | 99.6101224923 | 33.4426818252 |
| **47** | -0.0111532823 | 0.0094550614 | | -0.0537735624 | 7.9999486269 | 7.9999477625 | 7.9999478337 | 7.9999631734 | 99.6098652906 | 33.4332202088 |
| **48** | 0.0018276954 | 0.0036958760 | | -0.0173465109 | 7.9999630743 | 7.9999608187 | 7.9999513209 | 7.9999726113 | 99.6101908115 | 33.3572493829 |
| **49** | 0.0117745717 | -0.0314923015 | | -0.0059838213 | 7.9999645346 | 7.9999576195 | 7.9999582310 | 7.9999743902 | 99.6107333462 | 33.1300868718 |
| **50** | -0.0185998635 | -0.0097564729 | | 0.0545823921 | 7.9999634274 | 7.9999623355 | 7.9999645655 | 7.9999774018 | 99.6103113747 | 33.4408642511 |
| **Total** | -0.4164624820 | 3.9787253383 | | 0.1298681161 | 399.8225371254 | 399.8317623745 | 399.8282977451 | 399.8406867466 | 4980.4712496785 | 1672.1648460044 |
| **Average** | -0.0083290570 | 0.0794069731 | | 0.0025973565 | 7.9964507425 | 7.9966352475 | 7.9965659549 | 7.9968137349 | 99.6094249936 | 33.4432969201 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **6** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0069634757 | -0.0156208561 | | 0.0322655502 | 7.9999760846 | 7.9999802469 | 7.9999792688 | 7.9999923769 | 99.6109503601 | 33.4377906915 |
| **2** | -0.0063429846 | 0.0263688007 | | -0.0017708731 | 7.9999779054 | 7.9999777540 | 7.9999786778 | 7.9999935865 | 99.6092624743 | 32.7256895746 |
| **3** | 0.0130561769 | 0.0096488121 | | -0.0430046820 | 7.9999777337 | 7.9999735952 | 7.9999730835 | 7.9999922563 | 99.6077674897 | 33.4296644275 |
| **4** | -0.0122012311 | 0.0067737084 | | -0.0095432162 | 7.9999739010 | 7.9999738201 | 7.9999754193 | 7.9999924268 | 99.6089972351 | 33.4436964479 |
| **5** | -0.0036400854 | 0.0000213357 | | 0.0374505904 | 7.9999772984 | 7.9999784365 | 7.9999760481 | 7.9999928244 | 99.6081090856 | 33.4388975411 |
| **6** | 0.0090822544 | -0.0222169683 | | -0.0454828763 | 7.9999807769 | 7.9999749339 | 7.9999772945 | 7.9999928795 | 99.6085431134 | 33.4383456450 |
| **7** | -0.0106674495 | 0.0002599619 | | 0.0145644463 | 7.9999782342 | 7.9999794446 | 7.9999791109 | 7.9999936227 | 99.6105846515 | 33.4432194586 |
| **8** | 0.4211282221 | 0.7045712124 | | -0.1535023849 | 7.9752796324 | 7.9475661917 | 7.9444450572 | 7.9826870042 | 99.6093830376 | 33.5574909822 |
| **9** | -0.0455709318 | 0.0049152593 | | 0.0449853824 | 7.9999733016 | 7.9999789494 | 7.9999743847 | 7.9999932745 | 99.6102591307 | 33.4377422928 |
| **10** | 0.0144763384 | -0.0141488423 | | 0.0549483669 | 7.9999788027 | 7.9999749820 | 7.9999749667 | 7.9999920437 | 99.6100943609 | 33.4402894874 |
| **11** | -0.0011413330 | 0.0157237888 | | -0.0065104473 | 7.9999762131 | 7.9999780145 | 7.9999735951 | 7.9999929041 | 99.6088565779 | 33.4285526766 |
| **12** | 0.0107348442 | -0.0034437599 | | -0.0089629044 | 7.9999747613 | 7.9999773115 | 7.9999748254 | 7.9999921215 | 99.6111834491 | 33.4398702897 |
| **13** | -0.0290740837 | -0.0288189669 | | 0.0255320524 | 7.9999796458 | 7.9999769167 | 7.9999740615 | 7.9999932072 | 99.6082376865 | 33.4293861706 |
| **14** | -0.0262714651 | -0.0084276841 | | 0.0340182932 | 7.9999815347 | 7.9999789410 | 7.9999790354 | 7.9999933212 | 99.6098090278 | 33.4068683241 |
| **15** | 0.0147500734 | 0.0143746751 | | -0.0350338556 | 7.9999784372 | 7.9999793733 | 7.9999806942 | 7.9999930811 | 99.6088686343 | 33.4419802573 |
| **16** | 0.0182978820 | 0.0214413243 | | -0.0736685448 | 7.9999795608 | 7.9999753178 | 7.9999762649 | 7.9999938323 | 99.6100903421 | 33.4348494362 |
| **17** | -0.1458238211 | 0.3233398929 | | -0.5805348541 | 7.9735684005 | 7.9617634496 | 7.9869128734 | 7.9884352365 | 99.6094513567 | 33.0019503355 |
| **18** | -0.0044013484 | -0.0044679665 | | -0.0609508396 | 7.9999799276 | 7.9999808756 | 7.9999776035 | 7.9999933319 | 99.6107494213 | 33.4460770918 |
| **19** | -0.0221199323 | 0.0268324761 | | 0.0249293016 | 7.9999762760 | 7.9999805572 | 7.9999748349 | 7.9999927775 | 99.6090615355 | 33.4469683459 |
| **20** | 0.0063937618 | 0.0217936486 | | 0.0260354898 | 7.9999806124 | 7.9999796595 | 7.9999798465 | 7.9999933350 | 99.6094714506 | 33.4351996528 |
| **21** | 0.0071160412 | 0.0035401109 | | -0.0284765921 | 7.9999799997 | 7.9999799141 | 7.9999774632 | 7.9999925688 | 99.6078518840 | 31.3155758764 |
| **22** | -0.0102132647 | -0.0263281741 | | 0.0084014526 | 7.9999820325 | 7.9999775904 | 7.9999779124 | 7.9999932770 | 99.6094875257 | 33.4380558834 |
| **23** | 0.0090628306 | 0.0214993445 | | -0.0303790377 | 7.9999793241 | 7.9999764807 | 7.9999734490 | 7.9999930945 | 99.6093468686 | 33.4435108277 |
| **24** | 0.0111271877 | -0.0138437268 | | -0.0003787367 | 7.9999774110 | 7.9999740860 | 7.9999745365 | 7.9999920566 | 99.6088887281 | 33.4392147722 |
| **25** | -0.0328760967 | -0.0163792815 | | -0.0157887214 | 7.9999757244 | 7.9999776472 | 7.9999629475 | 7.9999920598 | 99.6090133102 | 33.2450098468 |
| **26** | -0.0018449976 | -0.0041272313 | | -0.0732216105 | 7.9999758152 | 7.9999770185 | 7.9999771002 | 7.9999926414 | 99.6089891975 | 33.4339208784 |
| **27** | -0.0068355699 | 0.0104968299 | | -0.0295111206 | 7.9999767804 | 7.9999730535 | 7.9999770880 | 7.9999919776 | 99.6089490098 | 33.4454995386 |
| **28** | 0.0099341965 | 0.0117835463 | | 0.0111807183 | 7.9999766132 | 7.9999782243 | 7.9999725773 | 7.9999920404 | 99.6119429977 | 33.4332830120 |
| **29** | -0.0161553074 | 0.0033450418 | | 0.0383215355 | 7.9999766757 | 7.9999786761 | 7.9999733203 | 7.9999918989 | 99.6063769933 | 33.4396554979 |
| **30** | -0.0084663073 | 0.0023511987 | | 0.0126483386 | 7.9999787125 | 7.9999784125 | 7.9999795006 | 7.9999916418 | 99.6099094972 | 33.4341927998 |
| **31** | 0.0035224117 | 0.0478092257 | | -0.0432357582 | 7.9999770167 | 7.9999796912 | 7.9999726409 | 7.9999934913 | 99.6092383616 | 33.4354245782 |
| **32** | -0.0197637165 | 0.0326758647 | | 0.0017194905 | 7.9999751807 | 7.9999791051 | 7.9999762773 | 7.9999917417 | 99.6087601273 | 33.4448364878 |
| **33** | -0.0039054701 | -0.0124011618 | | 0.0187071463 | 7.9999754550 | 7.9999760762 | 7.9999763495 | 7.9999921084 | 99.6083984375 | 33.4364832498 |
| **34** | 0.0483329698 | 0.0034461635 | | -0.0012176513 | 7.9999773333 | 7.9999806166 | 7.9999761445 | 7.9999927100 | 99.6092906057 | 33.7467383459 |
| **35** | -0.0205254960 | -0.0276703118 | | -0.0109587435 | 7.9999754303 | 7.9999767616 | 7.9999762264 | 7.9999919462 | 99.6090655543 | 33.4341983000 |
| **36** | -0.6830526816 | 0.9906107395 | | -0.1792055137 | 7.9321350752 | 7.9336554604 | 7.9579259368 | 7.9659565606 | 99.5736762153 | 31.6889369409 |
| **37** | -0.0023555988 | -0.0043722688 | | 0.0152494319 | 7.9999793258 | 7.9999781314 | 7.9999771551 | 7.9999933161 | 99.6086033951 | 33.4420916168 |
| **38** | -0.0083719229 | 0.0059321406 | | -0.0005517267 | 7.9999751498 | 7.9999784128 | 7.9999748937 | 7.9999923904 | 99.6076951517 | 33.4365054239 |
| **39** | -0.0011658123 | -0.0257387595 | | -0.0190367695 | 7.9999783911 | 7.9999775848 | 7.9999745118 | 7.9999930451 | 99.6078559028 | 33.4355879611 |
| **40** | -0.6670335036 | 0.9909923313 | | -0.1842443928 | 7.9463897095 | 7.9648294646 | 7.9430981906 | 7.9712996728 | 99.6117460777 | 33.4803619136 |
| **41** | -0.7530822676 | 0.9327421260 | | -0.0199843087 | 7.8979262920 | 7.8775831869 | 7.9228159069 | 7.9511405887 | 99.6088204090 | 32.0423029256 |
| **42** | 0.0162582382 | -0.0093154444 | | -0.0115431800 | 7.9999764167 | 7.9999781003 | 7.9999762359 | 7.9999921680 | 99.6096322016 | 33.4315248212 |
| **43** | -0.0182887232 | -0.0219411312 | | -0.0659777103 | 7.9999780030 | 7.9999804111 | 7.9999784861 | 7.9999925743 | 99.6108177405 | 33.4382338600 |
| **44** | 0.0089437608 | 0.0122585982 | | -0.0259947796 | 7.9999803853 | 7.9999762080 | 7.9999806871 | 7.9999932881 | 99.6098009902 | 33.4415288621 |
| **45** | -0.0158831116 | 0.9932480996 | | -0.3052990665 | 7.9298035989 | 7.9270291775 | 7.9061792354 | 7.9592571338 | 99.6090575167 | 33.4481759802 |
| **46** | -0.0000381275 | 0.0299791911 | | 0.0042744850 | 7.9999771072 | 7.9999752326 | 7.9999754211 | 7.9999921261 | 99.6105605388 | 33.4399286959 |
| **47** | 0.0090995235 | -0.0248708646 | | -0.0167233498 | 7.9999769472 | 7.9999757894 | 7.9999783190 | 7.9999922781 | 99.6092584555 | 33.4374963910 |
| **48** | 0.0156812172 | -0.0042831288 | | 0.0077371229 | 7.9999752275 | 7.9999791455 | 7.9999759268 | 7.9999917755 | 99.6062443737 | 33.4309472365 |
| **49** | -0.0249856746 | 0.0059913687 | | 0.0462903482 | 7.9999788358 | 7.9999781781 | 7.9999739442 | 7.9999915730 | 99.6112397119 | 33.4410311485 |
| **50** | -0.0176080353 | 0.0092219687 | | 0.0169056367 | 7.9999742636 | 7.9999786602 | 7.9999780639 | 7.9999922225 | 99.6089168596 | 33.4422212577 |
| **Total** | -1.9796718966 | 4.9955722575 | | -1.6045290680 | 399.6541132735 | 399.6114452688 | 399.6603233941 | 399.8184514112 | 4980.4291650592 | 1665.7470040586 |
| **Average** | -0.0395727615 | 0.0995803187 | | -0.0320795702 | 7.9930822655 | 7.9922289054 | 7.9932064679 | 7.9963690282 | 99.6085833012 | 33.3149400812 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **7** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.3880795992 | 1.0000000000 | | 0.1263622462 | 7.3631994541 | 7.2911882725 | 7.3481207558 | 7.3372046630 | 99.6086355453 | 33.2031380177 |
| **2** | 0.0210813440 | 0.0256953480 | | -0.0491970243 | 7.9991863488 | 7.9990614831 | 7.9991483772 | 7.9991474754 | 99.6098693094 | 33.4377828588 |
| **3** | 0.0073259502 | -0.0307665907 | | 0.0204393536 | 7.9991376706 | 7.9989801340 | 7.9990625301 | 7.9990737812 | 99.6079081469 | 33.4445309191 |
| **4** | 0.0130468783 | -0.0172317171 | | -0.0202192961 | 7.9991657577 | 7.9990433201 | 7.9990865906 | 7.9991147986 | 99.6071646734 | 33.4405823695 |
| **5** | 0.0065229943 | 0.0162887073 | | 0.0512341855 | 7.9966836114 | 7.9962280058 | 7.9964297732 | 7.9964647492 | 99.6078639403 | 33.4456046099 |
| **6** | -0.0010577141 | -0.0061363027 | | -0.0084731231 | 7.9974403362 | 7.9970288214 | 7.9972276199 | 7.9972506982 | 99.6086435828 | 33.4351870134 |
| **7** | -0.0013583450 | 0.0356612843 | | -0.0240940217 | 7.9992829519 | 7.9991426866 | 7.9991990565 | 7.9992242531 | 99.6099416474 | 33.4414891471 |
| **8** | -0.0041956067 | 0.0064298952 | | 0.0344113581 | 7.9991939201 | 7.9990264824 | 7.9990783969 | 7.9991174751 | 99.6091700424 | 33.4373152151 |
| **9** | 0.0063930162 | 0.0061558328 | | 0.0019816202 | 7.9988638653 | 7.9986530105 | 7.9987094518 | 7.9987586101 | 99.6101908115 | 33.4383508142 |
| **10** | 0.0151410836 | 0.0221285762 | | 0.0301292245 | 7.9991927991 | 7.9991282248 | 7.9991085148 | 7.9991583143 | 99.6094915445 | 33.4381203729 |
| **11** | -0.0142490558 | -0.0194242044 | | 0.0024521595 | 7.9981898588 | 7.9980201024 | 7.9980478286 | 7.9981039009 | 99.6080849730 | 33.4426490603 |
| **12** | 0.0048361251 | -0.0225697479 | | 0.0203979497 | 7.9990140010 | 7.9989354643 | 7.9989553995 | 7.9989828013 | 99.6084707755 | 33.4382619441 |
| **13** | 0.0341318202 | 0.0020081001 | | 0.0448747636 | 7.9991790499 | 7.9991022970 | 7.9991097458 | 7.9991444292 | 99.6064975566 | 33.4419519367 |
| **14** | 0.0238547153 | -0.0034672809 | | -0.0345479216 | 7.9987096001 | 7.9985865325 | 7.9985143416 | 7.9986201403 | 99.6066100823 | 33.4452166798 |
| **15** | -0.0015736680 | -0.0395522869 | | 0.0431516430 | 7.9992296131 | 7.9991179498 | 7.9991547287 | 7.9991832011 | 99.6067828897 | 33.4329763242 |
| **16** | 0.0169589965 | 0.0322228082 | | 0.0251245206 | 7.9993186733 | 7.9992166676 | 7.9992508334 | 7.9992765383 | 99.6095357510 | 33.4401597991 |
| **17** | -0.0044212890 | -0.0042260908 | | -0.0455413210 | 7.9991548536 | 7.9991115801 | 7.9991203233 | 7.9991453417 | 99.6064654064 | 33.4349685180 |
| **18** | -0.0138017114 | 0.0336575679 | | -0.0093744125 | 7.9990393065 | 7.9989187814 | 7.9989744290 | 7.9989919518 | 99.6076308513 | 33.4440122448 |
| **19** | -0.1613202818 | 1.0000000000 | | -0.0678452436 | 7.0778462712 | 6.9642826206 | 7.0259931495 | 7.0297560800 | 99.6166891718 | 32.3233333270 |
| **20** | -0.0233450304 | 0.0049713706 | | 0.0033199379 | 7.9990328964 | 7.9989042752 | 7.9989697890 | 7.9989845929 | 99.6087842400 | 33.4337325475 |
| **21** | 0.0079874548 | -0.0056021114 | | 0.0477376722 | 7.9960283974 | 7.9955002805 | 7.9957268200 | 7.9957699827 | 99.6082095550 | 33.4340491167 |
| **22** | 0.0021338909 | -0.0007758675 | | -0.0663985460 | 7.9989862748 | 7.9988560313 | 7.9988711326 | 7.9989202346 | 99.6091258359 | 33.4405459168 |
| **23** | -0.0114961525 | 0.0161286700 | | -0.0280071357 | 7.9992893106 | 7.9992091916 | 7.9992190896 | 7.9992530737 | 99.6062363362 | 33.4357166880 |
| **24** | -0.0248597538 | -0.0057898406 | | -0.0004710321 | 7.9991469476 | 7.9990404134 | 7.9990865561 | 7.9991081587 | 99.6070722415 | 33.4363421671 |
| **25** | -0.0045051315 | 0.0258410530 | | -0.0649032990 | 7.9996722173 | 7.9996173425 | 7.9996444986 | 7.9996595252 | 99.6104841821 | 33.4379500399 |
| **26** | -0.0065632151 | -0.0202664305 | | 0.0339681770 | 7.9991251686 | 7.9989900279 | 7.9990845842 | 7.9990807083 | 99.6065256880 | 33.4399319424 |
| **27** | 0.0648885280 | 0.0147346173 | | -0.0231188306 | 7.9986454413 | 7.9984833212 | 7.9985807023 | 7.9985841251 | 99.6092946245 | 33.4421870115 |
| **28** | -0.0303228641 | 0.0008439555 | | -0.0483887874 | 7.9991473172 | 7.9990207054 | 7.9990557156 | 7.9990907770 | 99.6065136317 | 33.4386290554 |
| **29** | 0.0138986098 | 0.0135437610 | | -0.0111345614 | 7.9985176105 | 7.9983047336 | 7.9984163487 | 7.9984291064 | 99.6090735918 | 33.4350173737 |
| **30** | 0.0140765605 | 0.0064725069 | | -0.0327804677 | 7.9990535313 | 7.9989451653 | 7.9990152885 | 7.9990186638 | 99.6076348701 | 33.4319336962 |
| **31** | -0.0182566538 | -0.0099210947 | | 0.0163529854 | 7.9987305900 | 7.9985412951 | 7.9985962689 | 7.9986382589 | 99.6085270383 | 33.4380870722 |
| **32** | 0.0152154744 | -0.0434708421 | | 0.0201238603 | 7.9993255100 | 7.9991976397 | 7.9992548038 | 7.9992739588 | 99.6077232832 | 33.4406848089 |
| **33** | -0.0314073411 | 0.0295091198 | | 0.0299545556 | 7.9969263711 | 7.9965243425 | 7.9967108728 | 7.9967363046 | 99.6080488040 | 33.4403154440 |
| **34** | -0.0170848964 | -0.0092296659 | | -0.0388432530 | 7.9996262620 | 7.9996275673 | 7.9996052566 | 7.9996328792 | 99.6078036587 | 33.4361102128 |
| **35** | 0.0085650840 | 0.0041914287 | | -0.0510160132 | 7.9989382646 | 7.9988688609 | 7.9989214304 | 7.9989253891 | 99.6085913387 | 34.0933230012 |
| **36** | 0.0137514411 | -0.0067130837 | | 0.0107634199 | 7.9991035060 | 7.9990216708 | 7.9990446923 | 7.9990710004 | 99.6100622106 | 33.4342002069 |
| **37** | 0.0271549882 | 0.0050280765 | | 0.0028511278 | 7.9994689402 | 7.9994401221 | 7.9994226966 | 7.9994574737 | 99.6056656700 | 34.0216226997 |
| **38** | 0.0262254650 | -0.0355470166 | | -0.0039232250 | 7.9992693489 | 7.9992206305 | 7.9992497086 | 7.9992609928 | 99.6108297968 | 33.4363538925 |
| **39** | -0.0041819234 | -0.0153957338 | | -0.0386572851 | 7.9980359040 | 7.9978329855 | 7.9979310639 | 7.9979492531 | 99.6072169174 | 33.4336470815 |
| **40** | -0.0086044549 | -0.0158211503 | | 0.0205482182 | 7.9991443603 | 7.9990469961 | 7.9991047532 | 7.9991146824 | 99.6125377765 | 32.0212036438 |
| **41** | -0.0081182454 | 0.0100477502 | | -0.0085148272 | 7.9992839727 | 7.9992231553 | 7.9992683490 | 7.9992740161 | 99.6072329925 | 33.5802603095 |
| **42** | -0.0015805321 | -0.0185390842 | | -0.0325569504 | 7.9991368105 | 7.9990641294 | 7.9991014349 | 7.9991164155 | 99.6097567837 | 33.4363620246 |
| **43** | 0.0441523536 | 0.0373360989 | | 0.0048623984 | 7.9965153924 | 7.9960138589 | 7.9962442429 | 7.9962744882 | 99.6090334041 | 33.4326379275 |
| **44** | 0.0041820134 | -0.0176099545 | | -0.0205851427 | 7.9991921948 | 7.9990944603 | 7.9991885808 | 7.9991736528 | 99.6093508873 | 33.4335308995 |
| **45** | 0.0206197216 | 0.0186514446 | | 0.0084083073 | 7.9991311423 | 7.9990463461 | 7.9990469964 | 7.9990906384 | 99.6069315844 | 33.4489899162 |
| **46** | -0.0223255187 | -0.0146987351 | | -0.0014249832 | 7.9992838870 | 7.9992181759 | 7.9992600725 | 7.9992706259 | 99.6095116384 | 33.4430842859 |
| **47** | -0.0048434461 | -0.0123228583 | | -0.0403468111 | 7.9969302942 | 7.9967021328 | 7.9968198393 | 7.9968324169 | 99.6096965021 | 33.4413141491 |
| **48** | -0.0097978511 | 0.0201217894 | | -0.0358736778 | 7.9984542576 | 7.9982463176 | 7.9983422309 | 7.9983628416 | 99.6086355453 | 33.4302321781 |
| **49** | -0.0067994809 | -0.0084814637 | | -0.0146311153 | 7.9984974687 | 7.9983958473 | 7.9985186483 | 7.9984898755 | 99.6079362783 | 33.4327540150 |
| **50** | 0.0084492183 | 0.0067956348 | | 0.0440268756 | 7.9998473258 | 7.9998080875 | 7.9998304385 | 7.9998430012 | 99.6069838284 | 33.4388858945 |
| **Total** | 0.3726031632 | 2.0109062429 | | -0.1773917477 | 398.3825148588 | 398.1897785464 | 398.3114247519 | 398.3054063164 | 4980.4266774370 | 1670.5252663904 |
| **Average** | 0.0074519253 | 0.0401964546 | | -0.0035478201 | 7.9676502972 | 7.9637955709 | 7.9662284950 | 7.9661081263 | 99.6085335487 | 33.4105053278 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **8** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0362665867 | -0.0048936354 | | -0.0491538302 | 7.9999761317 | 7.9999764188 | 7.9999806994 | 7.9999923313 | 99.6080045975 | 33.4344235720 |
| **2** | 0.0064475338 | 0.0125532797 | | -0.0122651149 | 7.9999768381 | 7.9999798055 | 7.9999743646 | 7.9999936193 | 99.6079644097 | 33.4407757750 |
| **3** | -0.0045733692 | -0.0160978166 | | 0.0314208825 | 7.9999786926 | 7.9999795404 | 7.9999810574 | 7.9999926539 | 99.6094553755 | 33.4404821050 |
| **4** | 0.0032504705 | -0.0110613562 | | -0.0190648557 | 7.9999793954 | 7.9999785497 | 7.9999802044 | 7.9999928656 | 99.6070320538 | 33.4382040895 |
| **5** | -0.0343545627 | -0.0381790646 | | 0.0321232019 | 7.9999780003 | 7.9999782885 | 7.9999795747 | 7.9999924754 | 99.6090213477 | 33.4473609409 |
| **6** | 0.0182119914 | 0.0145657790 | | -0.0080115474 | 7.9999692824 | 7.9999741222 | 7.9999754760 | 7.9999922906 | 99.6079684285 | 33.4385809876 |
| **7** | -0.0071810965 | -0.0104530862 | | 0.0174870288 | 7.9999740327 | 7.9999760826 | 7.9999778237 | 7.9999928536 | 99.6096201453 | 33.1688080437 |
| **8** | -0.0232577930 | -0.0058906127 | | -0.0341433124 | 7.9999788040 | 7.9999753628 | 7.9999774740 | 7.9999933865 | 99.6089891975 | 33.4421986580 |
| **9** | -0.4159128834 | 0.9563611765 | | -0.1246373350 | 7.8589782007 | 7.8699102098 | 7.8961100418 | 7.8808874274 | 99.6092986433 | 34.1603716406 |
| **10** | 0.4610158190 | 0.8001331555 | | 0.1650283140 | 7.8704715397 | 7.8793637055 | 7.8990333036 | 7.9176014925 | 99.6081251608 | 34.3730121244 |
| **11** | -0.0078154144 | 0.0072587156 | | -0.0203526140 | 7.9999808835 | 7.9999781348 | 7.9999780852 | 7.9999930277 | 99.6110749421 | 33.4443192635 |
| **12** | -0.0058263308 | 0.0076261858 | | -0.0085224426 | 7.9999755177 | 7.9999757747 | 7.9999780750 | 7.9999918609 | 99.6099336098 | 33.4432369048 |
| **13** | 0.0213396711 | 0.0031661994 | | -0.0158149764 | 7.9999767012 | 7.9999773161 | 7.9999747237 | 7.9999921020 | 99.6087400334 | 33.4472813061 |
| **14** | 0.4307273645 | 0.9079533427 | | -0.1106130065 | 7.9419391827 | 7.9535183075 | 7.9549776150 | 7.9577588200 | 99.6074218750 | 33.4681843928 |
| **15** | 0.0040585385 | -0.0145028576 | | 0.0158683369 | 7.9999784554 | 7.9999759388 | 7.9999789606 | 7.9999929453 | 99.6099938915 | 33.4398631032 |
| **16** | -0.0195840044 | -0.0033936637 | | -0.0332928810 | 7.9999780078 | 7.9999798273 | 7.9999782554 | 7.9999924861 | 99.6089449910 | 33.4342337755 |
| **17** | 0.0109245922 | 0.0083294887 | | -0.0350213515 | 7.9999789065 | 7.9999791088 | 7.9999777877 | 7.9999934336 | 99.6105082948 | 33.4399363079 |
| **18** | 0.0119792227 | 0.0082964359 | | -0.0210035809 | 7.9999714485 | 7.9999578130 | 7.9999603837 | 7.9999813693 | 99.6098813657 | 33.4198553367 |
| **19** | 0.4063067714 | 0.7673564883 | | 0.0048910063 | 7.9478201442 | 7.9656821009 | 7.9548862393 | 7.9743396827 | 99.6103756752 | 33.8613492275 |
| **20** | 0.0234860496 | -0.0180271657 | | 0.0437096109 | 7.9999762022 | 7.9999765556 | 7.9999766632 | 7.9999930604 | 99.6080889918 | 33.4319397323 |
| **21** | -0.0088709643 | -0.0038306116 | | -0.0283241356 | 7.9999779834 | 7.9999736993 | 7.9999782075 | 7.9999922869 | 99.6078398277 | 33.4457509721 |
| **22** | -0.0294022683 | -0.0111579313 | | -0.0580908793 | 7.9999769265 | 7.9999757467 | 7.9999771801 | 7.9999923216 | 99.6110829797 | 33.4403536933 |
| **23** | -0.0477968456 | -0.0053945858 | | 0.0176288470 | 7.9999764835 | 7.9999779411 | 7.9999773940 | 7.9999924345 | 99.6098693094 | 33.4453122951 |
| **24** | -0.0105448430 | 0.0115792641 | | 0.0027502812 | 7.9999746065 | 7.9999746628 | 7.9999771653 | 7.9999928499 | 99.6081090856 | 33.4466029998 |
| **25** | 0.0333255397 | 0.0196945438 | | -0.0434764608 | 7.9999783175 | 7.9999742415 | 7.9999785389 | 7.9999924995 | 99.6071606546 | 33.4414982406 |
| **26** | -0.0182696642 | -0.0025022436 | | -0.0146636269 | 7.9999739496 | 7.9999765797 | 7.9999778276 | 7.9999935822 | 99.6096603331 | 33.4448525630 |
| **27** | -0.0019590715 | 0.0214558835 | | 0.0259255982 | 7.9999764560 | 7.9999805989 | 7.9999812885 | 7.9999927036 | 99.6119349601 | 33.4484558918 |
| **28** | -0.0191114310 | 0.0036998892 | | 0.0213530329 | 7.9999796801 | 7.9999761977 | 7.9999778621 | 7.9999934791 | 99.6086194702 | 33.4386370141 |
| **29** | 0.0405351678 | -0.0023715058 | | 0.0267999667 | 7.9999774838 | 7.9999762376 | 7.9999768519 | 7.9999918736 | 99.6092986433 | 33.4410780815 |
| **30** | 0.0053001172 | 0.0347400556 | | 0.0258441273 | 7.9999757553 | 7.9999772207 | 7.9999738126 | 7.9999914311 | 99.6092906057 | 33.4441197904 |
| **31** | -0.0153406527 | 0.0083811834 | | -0.0538255172 | 7.9999774388 | 7.9999778331 | 7.9999758880 | 7.9999921326 | 99.6080287101 | 33.4394989548 |
| **32** | 0.0324614006 | -0.0265396783 | | -0.0347998206 | 7.9999756542 | 7.9999767605 | 7.9999778195 | 7.9999913544 | 99.6118264532 | 33.4532967042 |
| **33** | 0.0157625148 | -0.0056238508 | | -0.0375475991 | 7.9999768496 | 7.9999757054 | 7.9999792369 | 7.9999919354 | 99.6080608603 | 33.4466459456 |
| **34** | 0.0080604995 | 0.0194066149 | | -0.0632995027 | 7.9999734448 | 7.9999792245 | 7.9999752594 | 7.9999932120 | 99.6071968236 | 33.4424977337 |
| **35** | -0.0020518383 | -0.0062070828 | | 0.0096884431 | 7.9999770394 | 7.9999790683 | 7.9999778156 | 7.9999923724 | 99.6125297389 | 33.4385376006 |
| **36** | -0.0293926637 | -0.0075290328 | | -0.0169645011 | 7.9999774831 | 7.9999756818 | 7.9999774419 | 7.9999931478 | 99.6105002572 | 33.4404211614 |
| **37** | -0.0061164015 | -0.0086396046 | | 0.0196329060 | 7.9999760205 | 7.9999754844 | 7.9999813197 | 7.9999934913 | 99.6091780800 | 33.4320138668 |
| **38** | 0.0017578183 | 0.0114211242 | | 0.0571062383 | 7.9999759283 | 7.9999804372 | 7.9999790967 | 7.9999932488 | 99.6089490098 | 33.4373746142 |
| **39** | 0.0086407520 | -0.0133453809 | | 0.0018086176 | 7.9999729816 | 7.9999775141 | 7.9999787934 | 7.9999932645 | 99.6099617413 | 33.4445065227 |
| **40** | 0.0103615458 | 0.0123453924 | | -0.0089298379 | 7.9999750106 | 7.9999778185 | 7.9999775510 | 7.9999924707 | 99.6090454604 | 33.2800782353 |
| **41** | 0.0302304817 | -0.0027934543 | | -0.0012958375 | 7.9999742897 | 7.9999734925 | 7.9999779442 | 7.9999912249 | 99.6100903421 | 33.4319695185 |
| **42** | 0.0250659159 | -0.0212557593 | | 0.0149834220 | 7.9999750894 | 7.9999760728 | 7.9999799276 | 7.9999922325 | 99.6097969715 | 33.4422061755 |
| **43** | 0.0041450608 | -0.0055602032 | | 0.0515246056 | 7.9999807156 | 7.9999774755 | 7.9999796505 | 7.9999932503 | 99.6106288580 | 33.4432112319 |
| **44** | -0.0147651303 | -0.0098937342 | | 0.0167501021 | 7.9999752838 | 7.9999780941 | 7.9999740351 | 7.9999918087 | 99.6105163323 | 33.4370320569 |
| **45** | 0.0027913219 | -0.0294404709 | | 0.0436938085 | 7.9999780605 | 7.9999761097 | 7.9999774091 | 7.9999930517 | 99.6082376865 | 33.4425046523 |
| **46** | 0.0009945562 | -0.0083745412 | | -0.0104436801 | 7.9999774770 | 7.9999753218 | 7.9999798604 | 7.9999929484 | 99.6111553176 | 33.4389237656 |
| **47** | -0.5442351510 | 0.7941976071 | | 0.1127520899 | 7.9003847153 | 7.9248730202 | 7.8909977873 | 7.9406041333 | 99.6093106996 | 32.7772033293 |
| **48** | 0.0016077605 | 0.0067902372 | | -0.0406824667 | 7.9999715890 | 7.9999792392 | 7.9999783707 | 7.9999910406 | 99.6075786073 | 33.4311862512 |
| **49** | 0.0297387059 | 0.0075010767 | | 0.0146013845 | 7.9999768487 | 7.9999799264 | 7.9999733847 | 7.9999922024 | 99.6100300604 | 33.4378879301 |
| **50** | 0.0088808072 | 0.0067983541 | | -0.0411916010 | 7.9999741911 | 7.9999788199 | 7.9999788907 | 7.9999924853 | 99.6104922197 | 33.4443749433 |
| **Total** | 0.4273121973 | 4.1586525431 | | -0.1720604629 | 399.5185301204 | 399.5922991892 | 399.5949904192 | 399.6708466537 | 4980.4664231289 | 1673.0324500229 |
| **Average** | 0.0085460359 | 0.0829817898 | | -0.0034411957 | 7.9903706024 | 7.9918459838 | 7.9918998084 | 7.9934169331 | 99.6093284626 | 33.4606490005 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **9** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0103527282 | -0.0130899233 | | -0.0305509815 | 7.9999706789 | 7.9999773646 | 7.9999755428 | 7.9999886541 | 99.6088605967 | 33.4296436087 |
| **2** | -0.0173606077 | -0.0308512406 | | 0.0539072202 | 7.9999722177 | 7.9999722114 | 7.9999737485 | 7.9999875398 | 99.6085591885 | 33.7303624337 |
| **3** | -0.0108207315 | 0.0074757974 | | 0.0006856177 | 7.9999744732 | 7.9999796370 | 7.9999715985 | 7.9999887884 | 99.6094232253 | 33.4343678135 |
| **4** | 0.0032477982 | -0.0104996582 | | 0.0124545627 | 7.9999718099 | 7.9999750123 | 7.9999634538 | 7.9999870985 | 99.6086556391 | 33.4371982924 |
| **5** | 0.0230143642 | 0.0068344825 | | 0.0010128643 | 7.9999749316 | 7.9999772650 | 7.9999748587 | 7.9999913141 | 99.6104681070 | 33.4412829288 |
| **6** | -0.0093509900 | -0.0022426941 | | 0.0060653412 | 7.9999737199 | 7.9999775833 | 7.9999727941 | 7.9999896077 | 99.6111070923 | 33.4391141925 |
| **7** | 0.9369214338 | 0.9368309948 | | -0.1866590750 | 7.6285219163 | 7.5712286036 | 7.5768139999 | 7.7431820781 | 99.6102631494 | 33.2436992846 |
| **8** | 0.0102203051 | -0.0076405017 | | -0.0057436467 | 7.9999775891 | 7.9999788387 | 7.9999694321 | 7.9999900407 | 99.6113482189 | 33.4353052284 |
| **9** | -0.0036755635 | 0.0190823460 | | 0.0315427928 | 7.9999752492 | 7.9999765049 | 7.9999719647 | 7.9999896439 | 99.6075183256 | 33.4344617268 |
| **10** | -0.0141155456 | 0.0078384232 | | 0.0155871278 | 7.9999799476 | 7.9999709153 | 7.9999692473 | 7.9999886080 | 99.6100501543 | 33.4420606170 |
| **11** | 0.0271778612 | 0.0161345545 | | -0.0774009244 | 7.9999698078 | 7.9999782098 | 7.9999589419 | 7.9999852589 | 99.6075705697 | 33.4472919283 |
| **12** | 0.0203748764 | 0.0109027327 | | -0.0258802848 | 7.9999773092 | 7.9999781555 | 7.9999784794 | 7.9999913519 | 99.6099054784 | 33.4457710187 |
| **13** | 0.0051387765 | 0.0522320451 | | -0.0086550756 | 7.9999755139 | 7.9999754257 | 7.9999673865 | 7.9999883166 | 99.6095638825 | 33.4367807810 |
| **14** | -0.0219258455 | 0.0133345885 | | 0.0725287497 | 7.9999740201 | 7.9999724895 | 7.9999633773 | 7.9999854790 | 99.6088605967 | 33.7696455881 |
| **15** | 0.8577286953 | 0.6540140337 | | 0.1096495558 | 7.5712674809 | 7.4571432051 | 7.3396312928 | 7.5530589594 | 99.6083421746 | 32.8224236653 |
| **16** | -0.0114467456 | -0.0101131288 | | 0.0130305318 | 7.9999724230 | 7.9999708069 | 7.9999572073 | 7.9999823663 | 99.6090012539 | 33.4501581191 |
| **17** | -0.0262120389 | 0.0210306423 | | -0.0046573161 | 7.9999762192 | 7.9999712642 | 7.9999703730 | 7.9999891394 | 99.6085833012 | 33.4313609813 |
| **18** | 0.0046436184 | -0.0420295407 | | 0.0096850182 | 7.9999794863 | 7.9999706791 | 7.9999678782 | 7.9999899920 | 99.6101104360 | 33.4397319965 |
| **19** | 0.0071754098 | -0.0172511628 | | -0.0415300555 | 7.9999742453 | 7.9999726340 | 7.9999743534 | 7.9999886711 | 99.6123488940 | 33.4397544071 |
| **20** | 0.0297639346 | -0.0217888537 | | -0.0259127668 | 7.9999782066 | 7.9999745535 | 7.9999673288 | 7.9999891196 | 99.6102912809 | 33.4337115395 |
| **21** | -0.0148763586 | -0.0285590058 | | 0.0169738209 | 7.9999730935 | 7.9999714094 | 7.9999474410 | 7.9999802808 | 99.6098894033 | 33.4411816241 |
| **22** | 0.0305071409 | 0.0021392527 | | -0.0227425914 | 7.9999790819 | 7.9999791478 | 7.9999710753 | 7.9999911204 | 99.6101224923 | 33.4415551496 |
| **23** | -0.0254079336 | -0.0107898247 | | 0.0274687416 | 7.9999737299 | 7.9999744678 | 7.9999633060 | 7.9999857825 | 99.6093026620 | 33.4415450475 |
| **24** | 0.0073622484 | 0.0356994924 | | 0.0311695087 | 7.9999746031 | 7.9999761510 | 7.9999749747 | 7.9999912447 | 99.6083984375 | 33.4341721700 |
| **25** | 0.0146324886 | -0.0034306501 | | -0.0155513629 | 7.9999733297 | 7.9999772560 | 7.9999724393 | 7.9999899462 | 99.6061760545 | 33.4352593198 |
| **26** | 0.0021475255 | -0.0269802217 | | -0.0434454178 | 7.9999778516 | 7.9999680008 | 7.9999722391 | 7.9999895416 | 99.6100059478 | 33.4401146470 |
| **27** | -0.0112988767 | 0.0006408045 | | -0.0219950658 | 7.9999720912 | 7.9999724123 | 7.9999643491 | 7.9999849379 | 99.6099617413 | 33.4408040956 |
| **28** | -0.0060237331 | 0.0062041137 | | 0.0118033713 | 7.9999691586 | 7.9999694800 | 7.9999611298 | 7.9999825088 | 99.6084547004 | 33.4378137482 |
| **29** | -0.0144105984 | -0.0103167441 | | 0.0174490093 | 7.9999702871 | 7.9999718795 | 7.9999562347 | 7.9999819537 | 99.6115210262 | 33.4374239742 |
| **30** | 0.0235384292 | -0.0108641393 | | 0.0740331889 | 7.9999748305 | 7.9999771239 | 7.9999789771 | 7.9999913844 | 99.6106690458 | 33.4354479816 |
| **31** | 0.0336921432 | 0.0069248628 | | -0.0106332354 | 7.9999760054 | 7.9999792607 | 7.9999769622 | 7.9999920041 | 99.6109061535 | 33.4327525651 |
| **32** | -0.0060103203 | -0.0106184226 | | 0.0166782280 | 7.9999737190 | 7.9999749817 | 7.9999697108 | 7.9999896236 | 99.6100742670 | 33.4430015779 |
| **33** | -0.0151902957 | -0.0343530470 | | 0.0855804030 | 7.9999746776 | 7.9999738821 | 7.9999738755 | 7.9999905013 | 99.6095518261 | 33.4491274529 |
| **34** | -0.0034680048 | -0.0479157755 | | 0.0697289997 | 7.9999797775 | 7.9999767459 | 7.9999788904 | 7.9999913428 | 99.6097286523 | 33.4004221921 |
| **35** | 0.0017477301 | 0.0120139599 | | -0.0643508055 | 7.9999724295 | 7.9999721427 | 7.9999594703 | 7.9999829178 | 99.6076388889 | 33.4435097718 |
| **36** | 0.0262295079 | 0.0349955811 | | -0.0122528195 | 7.9999758453 | 7.9999742272 | 7.9999770616 | 7.9999914113 | 99.6078317901 | 33.4435632609 |
| **37** | 0.0008308788 | 0.0108728251 | | 0.0266785543 | 7.9999751557 | 7.9999782423 | 7.9999736058 | 7.9999901859 | 99.6090133102 | 33.4457338568 |
| **38** | -0.0004321922 | -0.0269159755 | | 0.0120793966 | 7.9999748762 | 7.9999739816 | 7.9999762441 | 7.9999914693 | 99.6089088220 | 33.4403491071 |
| **39** | -0.0095739588 | -0.0232331959 | | -0.0130385901 | 7.9999792643 | 7.9999739255 | 7.9999703444 | 7.9999893396 | 99.6087922775 | 33.4471381116 |
| **40** | -0.0143041635 | -0.0099130545 | | -0.0339882367 | 7.9999767891 | 7.9999734760 | 7.9999734544 | 7.9999898865 | 99.6105404450 | 33.4454299271 |
| **41** | 0.0284681381 | -0.0062773939 | | -0.0279549235 | 7.9999777557 | 7.9999748731 | 7.9999771033 | 7.9999905191 | 99.6090012539 | 33.4350538106 |
| **42** | -0.0107518113 | 0.0384458985 | | 0.0563087295 | 7.9999777108 | 7.9999746713 | 7.9999758806 | 7.9999902606 | 99.6076509452 | 33.4370630094 |
| **43** | 0.0190908792 | 0.0004872976 | | -0.0469533402 | 7.9999737457 | 7.9999767232 | 7.9999780467 | 7.9999901509 | 99.6086636767 | 33.4364741405 |
| **44** | 0.0185756167 | -0.0107170002 | | 0.0148052868 | 7.9999764229 | 7.9999785621 | 7.9999727885 | 7.9999910763 | 99.6095156572 | 33.4356817640 |
| **45** | 0.0035367429 | -0.0201406024 | | 0.0318204492 | 7.9999720312 | 7.9999750415 | 7.9999659362 | 7.9999866647 | 99.6096764082 | 33.4451794391 |
| **46** | -0.0094231158 | -0.0268398882 | | 0.0040460142 | 7.9999764786 | 7.9999637159 | 7.9999509666 | 7.9999856028 | 99.6092383616 | 33.4338960250 |
| **47** | -0.0084704858 | 0.0159862068 | | 0.0343403608 | 7.9999765674 | 7.9999745373 | 7.9999756910 | 7.9999895878 | 99.6087641461 | 33.4331837719 |
| **48** | -0.0207804141 | 0.0068847033 | | -0.0086213540 | 7.9999762317 | 7.9999765421 | 7.9999759699 | 7.9999904223 | 99.6084547004 | 33.4281822242 |
| **49** | -0.0023517388 | 0.0289386838 | | -0.0026927069 | 7.9999759899 | 7.9999715329 | 7.9999677655 | 7.9999861225 | 99.6094192065 | 33.4387572149 |
| **50** | -0.8466655318 | 0.9684171369 | | -0.4633088541 | 7.6485887579 | 7.5802256310 | 7.4766711248 | 7.7295951722 | 99.6220421811 | 32.8542479720 |
| **Total** | 1.0117716697 | 2.4509898145 | | -0.3374059854 | 398.8472055341 | 398.6074013841 | 398.3916963179 | 399.0252949900 | 4980.4807460455 | 1671.1381911041 |
| **Average** | 0.0202326719 | 0.0489805701 | | -0.0067480173 | 7.9769441107 | 7.9721480277 | 7.9678339264 | 7.9805058998 | 99.6096149209 | 33.4227638221 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **10** | | | | | | | |
| **Resolution** | | | **2160p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0211308300 | -0.0071656902 | | -0.0223691459 | 7.9999742767 | 7.9999794862 | 7.9999758296 | 7.9999923602 | 99.6076630015 | 33.4372010977 |
| **2** | -0.0317239722 | 0.0158244035 | | -0.0292366419 | 7.9999787565 | 7.9999769498 | 7.9999781962 | 7.9999919361 | 99.6103153935 | 33.4453494255 |
| **3** | -0.0162859459 | -0.0223123342 | | -0.0196747606 | 7.9999731831 | 7.9999772057 | 7.9999620584 | 7.9999913732 | 99.6095357510 | 33.4546643487 |
| **4** | -0.5241550128 | 0.9999677842 | | 0.0783475544 | 7.3533750116 | 7.7411468897 | 7.8127421637 | 7.8095169220 | 99.6051753794 | 34.6665488141 |
| **5** | 0.0045303536 | -0.0273962254 | | -0.0974884249 | 7.9999767105 | 7.9999752718 | 7.9999778091 | 7.9999921393 | 99.6107494213 | 33.4452395789 |
| **6** | -0.0151532084 | 0.0002903543 | | 0.0552167238 | 7.9999765655 | 7.9999779442 | 7.9999761311 | 7.9999921536 | 99.6103395062 | 33.4374177963 |
| **7** | 0.4474848698 | 1.0000000000 | | -0.1280950668 | 7.2977055175 | 7.6883707273 | 7.7027603888 | 7.7245230569 | 99.6068230774 | 34.7110417675 |
| **8** | -0.0104869656 | -0.0164422647 | | -0.0083498597 | 7.9999762244 | 7.9999765447 | 7.9999758579 | 7.9999922413 | 99.6104359568 | 33.4362362448 |
| **9** | -0.0028964236 | 0.0128122848 | | -0.0202207911 | 7.9999755373 | 7.9999788152 | 7.9999707864 | 7.9999925364 | 99.6090374228 | 33.4311478916 |
| **10** | 0.0137804872 | -0.0120293139 | | 0.0166289205 | 7.9999762790 | 7.9999770407 | 7.9999707640 | 7.9999918817 | 99.6085752636 | 31.5684407276 |
| **11** | 0.0149916683 | -0.0308376124 | | -0.0101344561 | 7.9999784365 | 7.9999742568 | 7.9999764346 | 7.9999924861 | 99.6087440522 | 33.4403091715 |
| **12** | 0.0151466105 | -0.0082981190 | | 0.0070068814 | 7.9999759170 | 7.9999753726 | 7.9999773339 | 7.9999922525 | 99.6083783436 | 33.4339499239 |
| **13** | 0.0121247513 | -0.0268400513 | | 0.0429819530 | 7.9999753453 | 7.9999775032 | 7.9999758799 | 7.9999919177 | 99.6109985854 | 33.6920105163 |
| **14** | 0.0075237560 | -0.0124260987 | | -0.0273653990 | 7.9999775304 | 7.9999777522 | 7.9999732000 | 7.9999923731 | 99.6054566937 | 33.4359615969 |
| **15** | -0.0346512844 | 0.0039015450 | | 0.0027438180 | 7.9999736704 | 7.9999810842 | 7.9999764444 | 7.9999922332 | 99.6089771412 | 33.4334001081 |
| **16** | 0.0101189539 | -0.0241352546 | | -0.0019656922 | 7.9999717294 | 7.9999741887 | 7.9999626283 | 7.9999911552 | 99.6081412359 | 33.4386435545 |
| **17** | -0.0130399409 | 0.0079595303 | | 0.0227264048 | 7.9999738619 | 7.9999785096 | 7.9999708688 | 7.9999917241 | 99.6090173290 | 33.4416029336 |
| **18** | -0.0022057051 | 0.0293238085 | | 0.0363429435 | 7.9999737681 | 7.9999763183 | 7.9999734073 | 7.9999917920 | 99.6069275656 | 33.4360089239 |
| **19** | -0.0283325219 | 0.0082241499 | | -0.0101333400 | 7.9999793045 | 7.9999729857 | 7.9999728162 | 7.9999926270 | 99.6102229617 | 33.4477799653 |
| **20** | 0.0164602703 | 0.0015340083 | | -0.0004846615 | 7.9999761250 | 7.9999763535 | 7.9999723873 | 7.9999918938 | 99.6088605967 | 34.0889242226 |
| **21** | 0.0142424463 | -0.0257626401 | | -0.0051932644 | 7.9999791014 | 7.9999765201 | 7.9999759843 | 7.9999931175 | 99.6088204090 | 33.4391792021 |
| **22** | 0.0190921485 | 0.0188487697 | | -0.0421682103 | 7.9999783012 | 7.9999740259 | 7.9999741078 | 7.9999919671 | 99.6076750579 | 33.4353827986 |
| **23** | -0.6512541424 | 0.6578442342 | | 0.0164841974 | 7.5415280662 | 7.9097568811 | 7.9395605329 | 7.9003590235 | 99.6099376286 | 33.4593353166 |
| **24** | -0.0316006536 | -0.0458010225 | | 0.0399446286 | 7.9999793975 | 7.9999784571 | 7.9999758567 | 7.9999933473 | 99.6103997878 | 33.4478087271 |
| **25** | -0.0043166139 | 0.0081321828 | | 0.0143249885 | 7.9999781509 | 7.9999746955 | 7.9999793997 | 7.9999925060 | 99.6094754694 | 33.4420831064 |
| **26** | -0.0103794789 | -0.0254154584 | | 0.0466769014 | 7.9999807452 | 7.9999786654 | 7.9999752313 | 7.9999926177 | 99.6093709812 | 33.4353250544 |
| **27** | 0.0029195359 | -0.0061074110 | | 0.0137352541 | 7.9999774904 | 7.9999751155 | 7.9999768041 | 7.9999912408 | 99.6089369534 | 33.4352781529 |
| **28** | -0.0173332321 | -0.0060527502 | | 0.0352960797 | 7.9999786676 | 7.9999754247 | 7.9999744026 | 7.9999915855 | 99.6093750000 | 33.4345424332 |
| **29** | -0.0092798766 | 0.0019240178 | | -0.0390632770 | 7.9999765683 | 7.9999745951 | 7.9999698587 | 7.9999920674 | 99.6090816294 | 33.4439371331 |
| **30** | 0.0032407633 | 0.0172816878 | | 0.0180966929 | 7.9999712774 | 7.9999786598 | 7.9999735671 | 7.9999908124 | 99.6109784915 | 33.4358718285 |
| **31** | -0.6866444434 | 1.0000000000 | | -0.0097536960 | 7.5577386550 | 7.8418434919 | 7.8581353565 | 7.8729328977 | 99.6094794882 | 33.0883377966 |
| **32** | -0.0132805806 | -0.0119668913 | | 0.0104144482 | 7.9999764670 | 7.9999772798 | 7.9999758304 | 7.9999928727 | 99.6080447852 | 33.4426940864 |
| **33** | -0.6219704216 | 1.0000000000 | | -0.0625127203 | 6.9761518650 | 7.5719865222 | 7.6844988284 | 7.7354601322 | 99.6073816872 | 32.2934937124 |
| **34** | -0.0204354231 | -0.0010100991 | | -0.0540246744 | 7.9999730811 | 7.9999791241 | 7.9999742066 | 7.9999922135 | 99.6075384195 | 33.4309592613 |
| **35** | -0.0000749329 | 0.0024186568 | | -0.0690882940 | 7.9999720139 | 7.9999766742 | 7.9999751774 | 7.9999908302 | 99.6099094972 | 33.4339179313 |
| **36** | -0.0053701496 | -0.0238644746 | | -0.0281199193 | 7.9999760395 | 7.9999787416 | 7.9999770231 | 7.9999928423 | 99.6095317323 | 33.9863104897 |
| **37** | -0.0062471559 | 0.0086692602 | | -0.0295462616 | 7.9999744801 | 7.9999738112 | 7.9999754765 | 7.9999938116 | 99.6075625322 | 33.4397427605 |
| **38** | 0.0213196316 | 0.0020359901 | | 0.0397103941 | 7.9999687047 | 7.9999709870 | 7.9999656412 | 7.9999910922 | 99.6104399756 | 33.4333318992 |
| **39** | 0.0034859076 | 0.0404522074 | | -0.0159656009 | 7.9999763979 | 7.9999751741 | 7.9999739614 | 7.9999925374 | 99.6089048032 | 33.4429609646 |
| **40** | 0.0352045335 | -0.0289540001 | | -0.0508386950 | 7.9999696087 | 7.9999705167 | 7.9999616073 | 7.9999908474 | 99.6081331983 | 33.4378607285 |
| **41** | -0.0278976532 | -0.0214822067 | | 0.0033874547 | 7.9999705419 | 7.9999598681 | 7.9999618441 | 7.9999878918 | 99.6086636767 | 33.4505740388 |
| **42** | -0.0371737159 | 0.0268243583 | | 0.0218226706 | 7.9999755150 | 7.9999697273 | 7.9999653886 | 7.9999904543 | 99.6118425283 | 33.4384709205 |
| **43** | 0.1399279060 | 1.0000000000 | | -0.0005237108 | 7.2203415315 | 7.4900237192 | 7.6453282064 | 7.7586501084 | 99.6081131044 | 32.0665791677 |
| **44** | 0.0061822029 | -0.0400979020 | | -0.0384322719 | 7.9999769973 | 7.9999740609 | 7.9999737624 | 7.9999918700 | 99.6087038645 | 33.4433720933 |
| **45** | -0.0080378758 | 0.0047395450 | | 0.0251504943 | 7.9999776616 | 7.9999757107 | 7.9999781806 | 7.9999930694 | 99.6096522955 | 33.4336023392 |
| **46** | -0.0002608535 | -0.0198063903 | | -0.0483274920 | 7.9999794423 | 7.9999768948 | 7.9999768760 | 7.9999921956 | 99.6077795460 | 33.4399895922 |
| **47** | -0.0143172777 | 0.0172841292 | | -0.0160897613 | 7.9999771422 | 7.9999765794 | 7.9999758218 | 7.9999919197 | 99.6106047454 | 33.4452120779 |
| **48** | -0.0240716031 | 0.0116188100 | | 0.0153069152 | 7.9999716544 | 7.9999711816 | 7.9999683412 | 7.9999912641 | 99.6096040702 | 33.4286588825 |
| **49** | -0.0091283160 | 0.0092205285 | | 0.0294449869 | 7.9999774662 | 7.9999725618 | 7.9999800644 | 7.9999920880 | 99.6106368956 | 33.4482356787 |
| **50** | 0.0222617598 | -0.0003484688 | | -0.0139197386 | 7.9999739011 | 7.9999763623 | 7.9999782352 | 7.9999927378 | 99.6101466049 | 33.6914626232 |
| **Total** | -2.0890976541 | 5.4625795674 | | -0.3072945216 | 395.9457706830 | 398.2420532294 | 398.6418569606 | 398.8010890174 | 4980.4510995370 | 1671.4463894065 |
| **Average** | -0.0417576567 | 0.1088189843 | | -0.0061458131 | 7.9189154137 | 7.9648410646 | 7.9728371392 | 7.9760217803 | 99.6090219907 | 33.4289277881 |

# DECRYPTION METRICS

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **1** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0002749409 | | 35.6076072757 |
| **2** | 0.0001691694 | | 37.7167816217 |
| **3** | 0.0001513465 | | 38.2002773946 |
| **4** | 0.0001606135 | | 37.9421786742 |
| **5** | 0.0001451349 | | 38.3822823788 |
| **6** | 0.0001590897 | | 37.9835791522 |
| **7** | 0.0001480212 | | 38.2967608670 |
| **8** | 0.0001574690 | | 38.0280499468 |
| **9** | 0.0001431151 | | 38.4431449982 |
| **10** | 0.0001592590 | | 37.9789608890 |
| **11** | 0.0001470492 | | 38.3253747412 |
| **12** | 0.0001568402 | | 38.0454264398 |
| **13** | 0.0001302635 | | 38.8517728457 |
| **14** | 0.0001552238 | | 38.0904164140 |
| **15** | 0.0001422843 | | 38.4684314915 |
| **16** | 0.0001523509 | | 38.1715504796 |
| **17** | 0.0001370630 | | 38.6307963128 |
| **18** | 0.0001479927 | | 38.2975962520 |
| **19** | 0.0001416085 | | 38.4891080559 |
| **20** | 0.0001472421 | | 38.3196794402 |
| **21** | 0.0001282960 | | 38.9178694478 |
| **22** | 0.0001463489 | | 38.3461062072 |
| **23** | 0.0001291769 | | 38.8881529326 |
| **24** | 0.0001426098 | | 38.4585054280 |
| **25** | 0.0001230575 | | 39.0989181525 |
| **26** | 0.0001468916 | | 38.3300315613 |
| **27** | 0.0001326101 | | 38.7742354664 |
| **28** | 0.0001437832 | | 38.4229186179 |
| **29** | 0.0001288269 | | 38.8999356305 |
| **30** | 0.0001452677 | | 38.3783107303 |
| **31** | 0.0001327491 | | 38.7696833353 |
| **32** | 0.0001418502 | | 38.4816990838 |
| **33** | 0.0001295729 | | 38.8748586407 |
| **34** | 0.0001442516 | | 38.4087941296 |
| **35** | 0.0001339563 | | 38.7303670392 |
| **36** | 0.0001444995 | | 38.4013355637 |
| **37** | 0.0001210569 | | 39.1701052830 |
| **38** | 0.0001451643 | | 38.3814011835 |
| **39** | 0.0001345612 | | 38.7108014296 |
| **40** | 0.0001455507 | | 38.3698561076 |
| **41** | 0.0001293383 | | 38.8827278709 |
| **42** | 0.0001442367 | | 38.4092419123 |
| **43** | 0.0001303288 | | 38.8495952664 |
| **44** | 0.0001433526 | | 38.4359451539 |
| **45** | 0.0001288658 | | 38.8986242511 |
| **46** | 0.0001437981 | | 38.4224686950 |
| **47** | 0.0001323049 | | 38.7842408519 |
| **48** | 0.0001435639 | | 38.4295476839 |
| **49** | 0.0001173635 | | 39.3046699391 |
| **50** | 0.0001426634 | | 38.4568746478 |
| **Total** | 0.0072219744 | | 1921.9575979139 |
| **Average** | 0.0001444395 | | 38.4391519583 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **2** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0005369605 | | 32.7005763968 |
| **2** | 0.0002075638 | | 36.8284843604 |
| **3** | 0.0002009237 | | 36.9696878001 |
| **4** | 0.0002006455 | | 36.9757056854 |
| **5** | 0.0001783041 | | 37.4883855774 |
| **6** | 0.0001789373 | | 37.4729902980 |
| **7** | 0.0001708830 | | 37.6730120168 |
| **8** | 0.0001777086 | | 37.5029144467 |
| **9** | 0.0001625489 | | 37.8901589191 |
| **10** | 0.0001636928 | | 37.8597037052 |
| **11** | 0.0001628523 | | 37.8820619901 |
| **12** | 0.0001759688 | | 37.5456436196 |
| **13** | 0.0001483447 | | 38.2872785103 |
| **14** | 0.0001761660 | | 37.5407786708 |
| **15** | 0.0001773720 | | 37.5111505855 |
| **16** | 0.0001774030 | | 37.5103899225 |
| **17** | 0.0001668989 | | 37.7754652328 |
| **18** | 0.0001689754 | | 37.7217657874 |
| **19** | 0.0001657972 | | 37.8042287253 |
| **20** | 0.0001727433 | | 37.6259877960 |
| **21** | 0.0001590084 | | 37.9857997154 |
| **22** | 0.0001609794 | | 37.9322973642 |
| **23** | 0.0001596021 | | 37.9696130382 |
| **24** | 0.0001732109 | | 37.6142480245 |
| **25** | 0.0001476887 | | 38.3065278512 |
| **26** | 0.0001757650 | | 37.5506765192 |
| **27** | 0.0001768133 | | 37.5248509138 |
| **28** | 0.0001774799 | | 37.5085080771 |
| **29** | 0.0001660009 | | 37.7988947733 |
| **30** | 0.0001678911 | | 37.7497235576 |
| **31** | 0.0001629181 | | 37.8803054872 |
| **32** | 0.0001690096 | | 37.7208856990 |
| **33** | 0.0001624063 | | 37.8939706925 |
| **34** | 0.0001646193 | | 37.8351914363 |
| **35** | 0.0001619785 | | 37.9054267405 |
| **36** | 0.0001780832 | | 37.4937697420 |
| **37** | 0.0001471519 | | 38.3223411237 |
| **38** | 0.0001692700 | | 37.7141991167 |
| **39** | 0.0001652899 | | 37.8175376934 |
| **40** | 0.0001673744 | | 37.7631104512 |
| **41** | 0.0001598862 | | 37.9618902084 |
| **42** | 0.0001700754 | | 37.6935844698 |
| **43** | 0.0001616255 | | 37.9149009649 |
| **44** | 0.0001683518 | | 37.7378214083 |
| **45** | 0.0001650109 | | 37.8248723641 |
| **46** | 0.0001680206 | | 37.7463755800 |
| **47** | 0.0001638078 | | 37.8566547111 |
| **48** | 0.0001789485 | | 37.4727202280 |
| **49** | 0.0001472434 | | 38.3196421983 |
| **50** | 0.0001660361 | | 37.7979758969 |
| **Total** | 0.0088322371 | | 1881.1806860929 |
| **Average** | 0.0001766447 | | 37.6236137219 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **3** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0005959442 | | 32.2479437497 |
| **2** | 0.0001840578 | | 37.3504580809 |
| **3** | 0.0001630651 | | 37.8763899994 |
| **4** | 0.0001674648 | | 37.7607639715 |
| **5** | 0.0001588407 | | 37.9903823225 |
| **6** | 0.0001691354 | | 37.7176559909 |
| **7** | 0.0001624215 | | 37.8935651217 |
| **8** | 0.0001728569 | | 37.6231336175 |
| **9** | 0.0001595726 | | 37.9704155213 |
| **10** | 0.0001745228 | | 37.5814777262 |
| **11** | 0.0001625675 | | 37.8896619370 |
| **12** | 0.0001725814 | | 37.6300607830 |
| **13** | 0.0001384813 | | 38.5860888544 |
| **14** | 0.0001720213 | | 37.6441764947 |
| **15** | 0.0001561641 | | 38.0641878571 |
| **16** | 0.0001660758 | | 37.7969368558 |
| **17** | 0.0001585410 | | 37.9985835418 |
| **18** | 0.0001704958 | | 37.6828620463 |
| **19** | 0.0001610076 | | 37.9315349508 |
| **20** | 0.0001715856 | | 37.6551917341 |
| **21** | 0.0001574035 | | 38.0298569971 |
| **22** | 0.0001733066 | | 37.6118482017 |
| **23** | 0.0001611104 | | 37.9287629981 |
| **24** | 0.0001713206 | | 37.6619036021 |
| **25** | 0.0001385441 | | 38.5841204019 |
| **26** | 0.0001694678 | | 37.7091275774 |
| **27** | 0.0001560936 | | 38.0661485168 |
| **28** | 0.0001676675 | | 37.7555098538 |
| **29** | 0.0001563247 | | 38.0597242845 |
| **30** | 0.0001685548 | | 37.7325879502 |
| **31** | 0.0001608714 | | 37.9352107060 |
| **32** | 0.0001710389 | | 37.6690508331 |
| **33** | 0.0001590325 | | 37.9851414374 |
| **34** | 0.0001711179 | | 37.6670460590 |
| **35** | 0.0001582679 | | 38.0060710396 |
| **36** | 0.0001675646 | | 37.7581769885 |
| **37** | 0.0001392525 | | 38.5619686950 |
| **38** | 0.0001769068 | | 37.5225559119 |
| **39** | 0.0001630372 | | 37.8771332437 |
| **40** | 0.0001746274 | | 37.5788764282 |
| **41** | 0.0001617535 | | 37.9114628937 |
| **42** | 0.0001760881 | | 37.5426997205 |
| **43** | 0.0001635707 | | 37.8629454815 |
| **44** | 0.0001742752 | | 37.5876441450 |
| **45** | 0.0001618949 | | 37.9076674095 |
| **46** | 0.0001746599 | | 37.5780673285 |
| **47** | 0.0001613039 | | 37.9235502267 |
| **48** | 0.0001687032 | | 37.7287655415 |
| **49** | 0.0001400206 | | 38.5380810522 |
| **50** | 0.0001741542 | | 37.5906610466 |
| **Total** | 0.0086553385 | | 1886.7638377282 |
| **Average** | 0.0001731068 | | 37.7352767546 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **4** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0002580779 | | 35.8824919130 |
| **2** | 0.0001579848 | | 38.0138478122 |
| **3** | 0.0001302271 | | 38.8529853374 |
| **4** | 0.0001334846 | | 38.7456890599 |
| **5** | 0.0001211462 | | 39.1669007464 |
| **6** | 0.0001308171 | | 38.8333545762 |
| **7** | 0.0001209992 | | 39.1721737962 |
| **8** | 0.0001296511 | | 38.8722370870 |
| **9** | 0.0001172070 | | 39.3104641012 |
| **10** | 0.0001299672 | | 38.8616611141 |
| **11** | 0.0001179875 | | 39.2816412844 |
| **12** | 0.0001287481 | | 38.9025932257 |
| **13** | 0.0001003532 | | 39.9846859852 |
| **14** | 0.0001243528 | | 39.0534438598 |
| **15** | 0.0001150552 | | 39.3909364207 |
| **16** | 0.0001238504 | | 39.0710248809 |
| **17** | 0.0001129909 | | 39.4695656526 |
| **18** | 0.0001242692 | | 39.0563649666 |
| **19** | 0.0001142563 | | 39.4211999954 |
| **20** | 0.0001235252 | | 39.0824430876 |
| **21** | 0.0001126000 | | 39.4846166195 |
| **22** | 0.0001245558 | | 39.0463619330 |
| **23** | 0.0001127264 | | 39.4797432660 |
| **24** | 0.0001234395 | | 39.0854584839 |
| **25** | 0.0000967185 | | 40.1449039007 |
| **26** | 0.0001234375 | | 39.0855277180 |
| **27** | 0.0001116880 | | 39.5199364351 |
| **28** | 0.0001223718 | | 39.1231871612 |
| **29** | 0.0001107228 | | 39.5576290364 |
| **30** | 0.0001249917 | | 39.0311890316 |
| **31** | 0.0001162587 | | 39.3457441447 |
| **32** | 0.0001262395 | | 38.9880471147 |
| **33** | 0.0001137470 | | 39.4406006646 |
| **34** | 0.0001263010 | | 38.9859315802 |
| **35** | 0.0001140311 | | 39.4297663411 |
| **36** | 0.0001247000 | | 39.0413360674 |
| **37** | 0.0000972324 | | 40.1218918195 |
| **38** | 0.0001224162 | | 39.1216115381 |
| **39** | 0.0001109795 | | 39.5475706508 |
| **40** | 0.0001214438 | | 39.1562466187 |
| **41** | 0.0001104783 | | 39.5672292382 |
| **42** | 0.0001226486 | | 39.1133728457 |
| **43** | 0.0001146670 | | 39.4056166713 |
| **44** | 0.0001250657 | | 39.0286188818 |
| **45** | 0.0001138410 | | 39.4370124691 |
| **46** | 0.0001244178 | | 39.0511752734 |
| **47** | 0.0001143355 | | 39.4181891457 |
| **48** | 0.0001244698 | | 39.0493597044 |
| **49** | 0.0000982510 | | 40.0766298076 |
| **50** | 0.0001208068 | | 39.1790879104 |
| **Total** | 0.0061205338 | | 1958.4892969752 |
| **Average** | 0.0001224107 | | 39.1697859395 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **5** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0003714352 | | 34.3011689854 |
| **2** | 0.0001717646 | | 37.6506635558 |
| **3** | 0.0001408836 | | 38.5113969193 |
| **4** | 0.0001423632 | | 38.4660212076 |
| **5** | 0.0001308503 | | 38.8322534783 |
| **6** | 0.0001453418 | | 38.3760944945 |
| **7** | 0.0001338644 | | 38.7333498011 |
| **8** | 0.0001446188 | | 38.3977518245 |
| **9** | 0.0001315335 | | 38.8096347562 |
| **10** | 0.0001429845 | | 38.4471114216 |
| **11** | 0.0001334134 | | 38.7480052826 |
| **12** | 0.0001434728 | | 38.4323040737 |
| **13** | 0.0001199929 | | 39.2084442046 |
| **14** | 0.0001394513 | | 38.5557741179 |
| **15** | 0.0001275873 | | 38.9419252192 |
| **16** | 0.0001376021 | | 38.6137506660 |
| **17** | 0.0001251172 | | 39.0268295349 |
| **18** | 0.0001385326 | | 38.5844815791 |
| **19** | 0.0001289338 | | 38.8963319186 |
| **20** | 0.0001384383 | | 38.5874363892 |
| **21** | 0.0001274463 | | 38.9467290103 |
| **22** | 0.0001439186 | | 38.4188292490 |
| **23** | 0.0001349139 | | 38.6994337966 |
| **24** | 0.0001456280 | | 38.3675506602 |
| **25** | 0.0001212015 | | 39.1649208221 |
| **26** | 0.0001462161 | | 38.3500477658 |
| **27** | 0.0001321976 | | 38.7877649686 |
| **28** | 0.0001430308 | | 38.4457034737 |
| **29** | 0.0001286402 | | 38.9062320178 |
| **30** | 0.0001436370 | | 38.4273352949 |
| **31** | 0.0001347551 | | 38.7045491130 |
| **32** | 0.0001456811 | | 38.3659679512 |
| **33** | 0.0001319143 | | 38.7970804012 |
| **34** | 0.0001479155 | | 38.2998629286 |
| **35** | 0.0001375206 | | 38.6163233210 |
| **36** | 0.0001483797 | | 38.2862559248 |
| **37** | 0.0001213927 | | 39.1580754192 |
| **38** | 0.0001468028 | | 38.3326572171 |
| **39** | 0.0001330979 | | 38.7582875393 |
| **40** | 0.0001429538 | | 38.4480425151 |
| **41** | 0.0001281790 | | 38.9218319552 |
| **42** | 0.0001430947 | | 38.4437644756 |
| **43** | 0.0001332867 | | 38.7521323855 |
| **44** | 0.0001443706 | | 38.4052110004 |
| **45** | 0.0001301772 | | 38.8546498189 |
| **46** | 0.0001455428 | | 38.3700912915 |
| **47** | 0.0001357327 | | 38.6731543754 |
| **48** | 0.0001460404 | | 38.3552699005 |
| **49** | 0.0001214989 | | 39.1542782382 |
| **50** | 0.0001466075 | | 38.3384383381 |
| **Total** | 0.0071199557 | | 1926.6712005990 |
| **Average** | 0.0001423991 | | 38.5334240120 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **6** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0007644890 | | 31.1662873766 |
| **2** | 0.0002720296 | | 35.6538385824 |
| **3** | 0.0002475925 | | 36.0626243864 |
| **4** | 0.0002413693 | | 36.1731800331 |
| **5** | 0.0002419022 | | 36.1636019634 |
| **6** | 0.0002357144 | | 36.2761388807 |
| **7** | 0.0002294223 | | 36.3936434309 |
| **8** | 0.0002314959 | | 36.3545671788 |
| **9** | 0.0002301518 | | 36.3798554530 |
| **10** | 0.0002273828 | | 36.4324243130 |
| **11** | 0.0002249689 | | 36.4787750357 |
| **12** | 0.0002283306 | | 36.4143595380 |
| **13** | 0.0001956312 | | 37.0856189097 |
| **14** | 0.0002163285 | | 36.6488617689 |
| **15** | 0.0002201875 | | 36.5720737146 |
| **16** | 0.0002294732 | | 36.3926804932 |
| **17** | 0.0002254948 | | 36.4686344521 |
| **18** | 0.0002269601 | | 36.4405043709 |
| **19** | 0.0002244910 | | 36.4880112250 |
| **20** | 0.0002278255 | | 36.4239768912 |
| **21** | 0.0002252764 | | 36.4728425324 |
| **22** | 0.0002283262 | | 36.4144428721 |
| **23** | 0.0002251113 | | 36.4760271443 |
| **24** | 0.0002276723 | | 36.4268978597 |
| **25** | 0.0001939872 | | 37.1222693343 |
| **26** | 0.0002179505 | | 36.6164206007 |
| **27** | 0.0002142232 | | 36.6913353700 |
| **28** | 0.0002211627 | | 36.5528805021 |
| **29** | 0.0002202892 | | 36.5700688185 |
| **30** | 0.0002230902 | | 36.5151953502 |
| **31** | 0.0002221676 | | 36.5331921680 |
| **32** | 0.0002271079 | | 36.4376771547 |
| **33** | 0.0002247761 | | 36.4824980273 |
| **34** | 0.0002284024 | | 36.4129936225 |
| **35** | 0.0002250431 | | 36.4773431634 |
| **36** | 0.0002305904 | | 36.3715881849 |
| **37** | 0.0001932758 | | 37.1382254007 |
| **38** | 0.0002238794 | | 36.4998587586 |
| **39** | 0.0002153133 | | 36.6692915278 |
| **40** | 0.0002243344 | | 36.4910406350 |
| **41** | 0.0002227499 | | 36.5218256121 |
| **42** | 0.0002253155 | | 36.4720888282 |
| **43** | 0.0002209209 | | 36.5576326241 |
| **44** | 0.0002282999 | | 36.4149436863 |
| **45** | 0.0002276394 | | 36.4275260854 |
| **46** | 0.0002305546 | | 36.3722627342 |
| **47** | 0.0002253650 | | 36.4711344597 |
| **48** | 0.0002331933 | | 36.3228386705 |
| **49** | 0.0001950647 | | 37.0982122524 |
| **50** | 0.0002267770 | | 36.4440099002 |
| **Total** | 0.0117891010 | | 1818.9442218781 |
| **Average** | 0.0002357820 | | 36.3788844376 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **7** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0002038422 | | 36.9070597873 |
| **2** | 0.0001281405 | | 38.9231356367 |
| **3** | 0.0001120073 | | 39.5075382631 |
| **4** | 0.0001109587 | | 39.5483875440 |
| **5** | 0.0001103058 | | 39.5740169605 |
| **6** | 0.0001122048 | | 39.4998864183 |
| **7** | 0.0001055811 | | 39.7641364900 |
| **8** | 0.0001064750 | | 39.7275243890 |
| **9** | 0.0001059445 | | 39.7492151797 |
| **10** | 0.0001108573 | | 39.5523584838 |
| **11** | 0.0001049952 | | 39.7883062606 |
| **12** | 0.0001056583 | | 39.7609653771 |
| **13** | 0.0000903017 | | 40.4430426948 |
| **14** | 0.0001028984 | | 39.8759156959 |
| **15** | 0.0000993138 | | 40.0299039722 |
| **16** | 0.0001020994 | | 39.9097696349 |
| **17** | 0.0000975504 | | 40.1077093863 |
| **18** | 0.0001038199 | | 39.8371948452 |
| **19** | 0.0000995022 | | 40.0216724033 |
| **20** | 0.0001106963 | | 39.5586683724 |
| **21** | 0.0000993837 | | 40.0268495234 |
| **22** | 0.0001112448 | | 39.5372024096 |
| **23** | 0.0001015612 | | 39.9327232583 |
| **24** | 0.0001073000 | | 39.6940038206 |
| **25** | 0.0000874486 | | 40.5824736377 |
| **26** | 0.0001015618 | | 39.9326974378 |
| **27** | 0.0000999975 | | 40.0001088682 |
| **28** | 0.0001012134 | | 39.9476201163 |
| **29** | 0.0001026442 | | 39.8866554431 |
| **30** | 0.0001069660 | | 39.7075438874 |
| **31** | 0.0001009145 | | 39.9604664138 |
| **32** | 0.0001020585 | | 39.9115086348 |
| **33** | 0.0001002873 | | 39.9875420820 |
| **34** | 0.0001049606 | | 39.7897363913 |
| **35** | 0.0000985380 | | 40.0639632217 |
| **36** | 0.0000987507 | | 40.0545971394 |
| **37** | 0.0000860328 | | 40.6533602439 |
| **38** | 0.0001039554 | | 39.8315295954 |
| **39** | 0.0000931773 | | 40.3069006888 |
| **40** | 0.0001001753 | | 39.9923922148 |
| **41** | 0.0000983334 | | 40.0729902638 |
| **42** | 0.0000995515 | | 40.0195212849 |
| **43** | 0.0001005314 | | 39.9769826457 |
| **44** | 0.0001036810 | | 39.8430096437 |
| **45** | 0.0000981649 | | 40.0804396563 |
| **46** | 0.0000990963 | | 40.0394271833 |
| **47** | 0.0000935522 | | 40.2894599118 |
| **48** | 0.0001024031 | | 39.8968686998 |
| **49** | 0.0000850771 | | 40.7018748599 |
| **50** | 0.0001041241 | | 39.8244857663 |
| **Total** | 0.0052158387 | | 1992.6313427387 |
| **Average** | 0.0001043168 | | 39.8526268548 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **8** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0006799453 | | 31.6752600971 |
| **2** | 0.0002322740 | | 36.3399948513 |
| **3** | 0.0002036920 | | 36.9102605137 |
| **4** | 0.0002078476 | | 36.8225506319 |
| **5** | 0.0001939796 | | 37.1224390278 |
| **6** | 0.0002044294 | | 36.8945667679 |
| **7** | 0.0001898060 | | 37.2169005656 |
| **8** | 0.0001995771 | | 36.9988938653 |
| **9** | 0.0001872799 | | 37.2750891230 |
| **10** | 0.0002019029 | | 36.9485748090 |
| **11** | 0.0001880783 | | 37.2566128624 |
| **12** | 0.0001995009 | | 37.0005519348 |
| **13** | 0.0001618212 | | 37.9096456797 |
| **14** | 0.0001987557 | | 37.0168042810 |
| **15** | 0.0001819509 | | 37.4004582180 |
| **16** | 0.0001953585 | | 37.0916765141 |
| **17** | 0.0001787442 | | 37.4776802687 |
| **18** | 0.0001965657 | | 37.0649221258 |
| **19** | 0.0001824264 | | 37.3891233361 |
| **20** | 0.0001937151 | | 37.1283653981 |
| **21** | 0.0001806986 | | 37.4304510558 |
| **22** | 0.0001979506 | | 37.0344318724 |
| **23** | 0.0001845805 | | 37.3381428397 |
| **24** | 0.0001970714 | | 37.0537646369 |
| **25** | 0.0001619582 | | 37.9059701934 |
| **26** | 0.0001994307 | | 37.0020794529 |
| **27** | 0.0001834273 | | 37.3653606448 |
| **28** | 0.0001966214 | | 37.0636918667 |
| **29** | 0.0001797875 | | 37.4524043788 |
| **30** | 0.0001984099 | | 37.0243670557 |
| **31** | 0.0001837776 | | 37.3570752633 |
| **32** | 0.0001949479 | | 37.1008134128 |
| **33** | 0.0001809829 | | 37.4236234908 |
| **34** | 0.0001982457 | | 37.0279632112 |
| **35** | 0.0001847575 | | 37.3339786120 |
| **36** | 0.0001975958 | | 37.0422218632 |
| **37** | 0.0001627058 | | 37.8859695650 |
| **38** | 0.0002009863 | | 36.9683362497 |
| **39** | 0.0001841304 | | 37.3487443319 |
| **40** | 0.0001987735 | | 37.0164148695 |
| **41** | 0.0001803418 | | 37.4390365809 |
| **42** | 0.0002000157 | | 36.9893583716 |
| **43** | 0.0001852743 | | 37.3218482970 |
| **44** | 0.0001965522 | | 37.0652207014 |
| **45** | 0.0001817803 | | 37.4045321275 |
| **46** | 0.0001994448 | | 37.0017732227 |
| **47** | 0.0001854979 | | 37.3166098811 |
| **48** | 0.0001982515 | | 37.0278352673 |
| **49** | 0.0001632943 | | 37.8702902605 |
| **50** | 0.0002011621 | | 36.9645383762 |
| **Total** | 0.0100361050 | | 1854.5172188238 |
| **Average** | 0.0002007221 | | 37.0903443765 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **9** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0001731840 | | 37.6149218474 |
| **2** | 0.0001107052 | | 39.5583179151 |
| **3** | 0.0001028700 | | 39.8771136018 |
| **4** | 0.0001084850 | | 39.6463038394 |
| **5** | 0.0001028982 | | 39.8759233909 |
| **6** | 0.0001147258 | | 39.4033881480 |
| **7** | 0.0001077404 | | 39.6762149123 |
| **8** | 0.0001101715 | | 39.5793060589 |
| **9** | 0.0000993125 | | 40.0299589442 |
| **10** | 0.0001031301 | | 39.8661452978 |
| **11** | 0.0000947402 | | 40.2346570105 |
| **12** | 0.0000970397 | | 40.1305052311 |
| **13** | 0.0000923399 | | 40.3461082330 |
| **14** | 0.0001096137 | | 39.6013506885 |
| **15** | 0.0001022144 | | 39.9048809702 |
| **16** | 0.0001063890 | | 39.7310313997 |
| **17** | 0.0001005210 | | 39.9774334294 |
| **18** | 0.0001044279 | | 39.8118359004 |
| **19** | 0.0001001828 | | 39.9920681271 |
| **20** | 0.0001029941 | | 39.8718766835 |
| **21** | 0.0000920615 | | 40.3592204130 |
| **22** | 0.0000961563 | | 40.1702208815 |
| **23** | 0.0000928516 | | 40.3221077809 |
| **24** | 0.0001042225 | | 39.8203832559 |
| **25** | 0.0000925671 | | 40.3354355131 |
| **26** | 0.0001092819 | | 39.6145183506 |
| **27** | 0.0001020734 | | 39.9108725475 |
| **28** | 0.0001042833 | | 39.8178523227 |
| **29** | 0.0000952659 | | 40.2106248811 |
| **30** | 0.0000992682 | | 40.0318985997 |
| **31** | 0.0000942580 | | 40.2568195685 |
| **32** | 0.0000965873 | | 40.1508002334 |
| **33** | 0.0000929218 | | 40.3188237298 |
| **34** | 0.0001028554 | | 39.8777289754 |
| **35** | 0.0000976687 | | 40.1024438528 |
| **36** | 0.0001043990 | | 39.8130357211 |
| **37** | 0.0000913261 | | 40.3940512012 |
| **38** | 0.0000962437 | | 40.1662752088 |
| **39** | 0.0000984573 | | 40.0675203173 |
| **40** | 0.0001017319 | | 39.9254289786 |
| **41** | 0.0000922654 | | 40.3496113851 |
| **42** | 0.0000967152 | | 40.1450531236 |
| **43** | 0.0000926046 | | 40.3336752779 |
| **44** | 0.0000965697 | | 40.1515924399 |
| **45** | 0.0000922058 | | 40.3524153256 |
| **46** | 0.0001079781 | | 39.6666442009 |
| **47** | 0.0001018864 | | 39.9188367709 |
| **48** | 0.0001042629 | | 39.8187031144 |
| **49** | 0.0000913686 | | 40.3920313285 |
| **50** | 0.0000972231 | | 40.1223061066 |
| **Total** | 0.0050812461 | | 1997.6462730356 |
| **Average** | 0.0001016249 | | 39.9529254607 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **10** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0000674171 | | 41.7122974066 |
| **2** | 0.0000686385 | | 41.6343197604 |
| **3** | 0.0000680745 | | 41.6701563714 |
| **4** | 0.0000684849 | | 41.6440515142 |
| **5** | 0.0000677965 | | 41.6879267584 |
| **6** | 0.0000691508 | | 41.6020297541 |
| **7** | 0.0000687678 | | 41.6261472850 |
| **8** | 0.0000690296 | | 41.6096454678 |
| **9** | 0.0000683646 | | 41.6516841355 |
| **10** | 0.0000693745 | | 41.5880044262 |
| **11** | 0.0000689752 | | 41.6130683067 |
| **12** | 0.0000693239 | | 41.5911704952 |
| **13** | 0.0000681729 | | 41.6638813214 |
| **14** | 0.0000698426 | | 41.5587973493 |
| **15** | 0.0000691409 | | 41.6026509565 |
| **16** | 0.0000693791 | | 41.5877134875 |
| **17** | 0.0000684544 | | 41.6459858984 |
| **18** | 0.0000697560 | | 41.5641857822 |
| **19** | 0.0000691955 | | 41.5992202946 |
| **20** | 0.0000692485 | | 41.5958973022 |
| **21** | 0.0000683584 | | 41.6520835604 |
| **22** | 0.0000701324 | | 41.5408152766 |
| **23** | 0.0000696694 | | 41.5695791367 |
| **24** | 0.0000701258 | | 41.5412213597 |
| **25** | 0.0000682884 | | 41.6565324867 |
| **26** | 0.0000706410 | | 41.5094332441 |
| **27** | 0.0000698862 | | 41.5560879516 |
| **28** | 0.0000703318 | | 41.5284806903 |
| **29** | 0.0000698973 | | 41.5553930772 |
| **30** | 0.0000718578 | | 41.4352580645 |
| **31** | 0.0000711252 | | 41.4797648446 |
| **32** | 0.0000715525 | | 41.4537543261 |
| **33** | 0.0000705385 | | 41.5157357359 |
| **34** | 0.0000723127 | | 41.4078545880 |
| **35** | 0.0000715331 | | 41.4549307572 |
| **36** | 0.0000719238 | | 41.4312763602 |
| **37** | 0.0000684930 | | 41.6435356541 |
| **38** | 0.0000706283 | | 41.5102097294 |
| **39** | 0.0000695312 | | 41.5782056907 |
| **40** | 0.0000698986 | | 41.5553122448 |
| **41** | 0.0000689335 | | 41.6156943866 |
| **42** | 0.0000702470 | | 41.5337206166 |
| **43** | 0.0000695170 | | 41.5790910965 |
| **44** | 0.0000698851 | | 41.5561544725 |
| **45** | 0.0000689081 | | 41.6172983983 |
| **46** | 0.0000702615 | | 41.5328229422 |
| **47** | 0.0000696949 | | 41.5679877974 |
| **48** | 0.0000698984 | | 41.5553299856 |
| **49** | 0.0000681294 | | 41.6666529604 |
| **50** | 0.0000694781 | | 41.5815184911 |
| **Total** | 0.0034782664 | | 2078.8305699996 |
| **Average** | 0.0000695653 | | 41.5766114000 |

# PROCESSING TIME

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **1** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.0574696064 | | 3.2116901875 |
| **2** | 2.9440619946 | | 2.8535537720 |
| **3** | 2.8770403862 | | 2.8364582062 |
| **4** | 2.8662815094 | | 2.8243494034 |
| **5** | 2.9133019447 | | 2.8582198620 |
| **6** | 2.9820713997 | | 2.8392915726 |
| **7** | 2.8974714279 | | 2.8510777950 |
| **8** | 2.8730247021 | | 2.8863978386 |
| **9** | 2.8700435162 | | 2.8463182449 |
| **10** | 2.8727355003 | | 2.8594422340 |
| **11** | 2.9135105610 | | 2.9394958019 |
| **12** | 2.9089298248 | | 2.8515019417 |
| **13** | 2.8911828995 | | 2.8479869366 |
| **14** | 2.9002239704 | | 2.8664097786 |
| **15** | 2.8716521263 | | 2.8633012772 |
| **16** | 2.8713872433 | | 2.8534390926 |
| **17** | 2.8615343571 | | 2.8596928120 |
| **18** | 2.8707315922 | | 2.8470187187 |
| **19** | 2.8592016697 | | 2.8457565308 |
| **20** | 2.8634228706 | | 2.8580362797 |
| **21** | 2.8745834827 | | 2.8836183548 |
| **22** | 2.8717200756 | | 2.8455941677 |
| **23** | 2.9241182804 | | 2.8652858734 |
| **24** | 2.9781880379 | | 2.8647334576 |
| **25** | 2.8910300732 | | 2.8481709957 |
| **26** | 2.8640930653 | | 2.8537871838 |
| **27** | 2.8577117920 | | 2.8442308903 |
| **28** | 2.8833053112 | | 2.8723516464 |
| **29** | 2.8562846184 | | 2.8443341255 |
| **30** | 2.8806550503 | | 2.8682897091 |
| **31** | 2.8668119907 | | 2.8570034504 |
| **32** | 2.8802094460 | | 2.8471381664 |
| **33** | 2.8602924347 | | 2.8334512711 |
| **34** | 2.8761465549 | | 2.8363482952 |
| **35** | 2.8663878441 | | 2.8402881622 |
| **36** | 2.9377017021 | | 2.8469772339 |
| **37** | 2.8641664982 | | 2.8541071415 |
| **38** | 2.8744812012 | | 2.8528099060 |
| **39** | 2.8524532318 | | 2.8466641903 |
| **40** | 2.8816998005 | | 2.8673121929 |
| **41** | 2.8732419014 | | 2.8374977112 |
| **42** | 2.8764250278 | | 2.8534710407 |
| **43** | 2.8591837883 | | 2.8481912613 |
| **44** | 2.8714957237 | | 2.8643901348 |
| **45** | 2.8545668125 | | 2.8420445919 |
| **46** | 2.8730423450 | | 2.8589477539 |
| **47** | 2.9223926067 | | 2.8526887894 |
| **48** | 2.8647108078 | | 2.8351035118 |
| **49** | 2.8653340340 | | 2.8419427872 |
| **50** | 2.8679120541 | | 2.8425168991 |
| **Total** | 144.3356246948 | | 143.0487291813 |
| **Average** | 2.8867124939 | | 2.8609745836 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **2** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.0315163136 | | 3.4358854294 |
| **2** | 2.9091229439 | | 2.9435930252 |
| **3** | 2.8864459991 | | 2.8825964928 |
| **4** | 2.8650829792 | | 2.8477106094 |
| **5** | 2.9276993275 | | 2.8563261032 |
| **6** | 2.9090030193 | | 2.8367643356 |
| **7** | 2.9047961235 | | 2.8374276161 |
| **8** | 2.9092500210 | | 2.8369131088 |
| **9** | 2.9057447910 | | 2.8746681213 |
| **10** | 2.9076869488 | | 2.9385528564 |
| **11** | 2.9497973919 | | 2.8427155018 |
| **12** | 2.8940370083 | | 2.8505461216 |
| **13** | 2.8838884830 | | 2.8537046909 |
| **14** | 2.8945646286 | | 2.8620486259 |
| **15** | 2.8830938339 | | 2.8368053436 |
| **16** | 2.8808670044 | | 2.8426890373 |
| **17** | 2.8798396587 | | 2.8433294296 |
| **18** | 2.8842103481 | | 2.8791356087 |
| **19** | 2.8829624653 | | 2.9197545052 |
| **20** | 2.8900883198 | | 2.8830835819 |
| **21** | 2.8719258308 | | 2.8583884239 |
| **22** | 2.8791849613 | | 2.8214931488 |
| **23** | 2.8880317211 | | 2.8176386356 |
| **24** | 2.8885068893 | | 2.8616933823 |
| **25** | 2.9756553173 | | 2.8706960678 |
| **26** | 2.8555705547 | | 2.8584971428 |
| **27** | 2.8623116016 | | 2.8440380096 |
| **28** | 2.8561084270 | | 2.8266532421 |
| **29** | 2.8512923717 | | 2.8630359173 |
| **30** | 2.8661351204 | | 2.8479292393 |
| **31** | 2.8669652939 | | 2.8626356125 |
| **32** | 2.8580167294 | | 2.8645892143 |
| **33** | 2.8580269814 | | 2.8319423199 |
| **34** | 2.8529055119 | | 2.8440687656 |
| **35** | 2.8512227535 | | 2.8187749386 |
| **36** | 2.9129583836 | | 2.8475937843 |
| **37** | 2.8540992737 | | 2.8589019775 |
| **38** | 2.8725082874 | | 2.9156570435 |
| **39** | 2.8645615578 | | 2.8307726383 |
| **40** | 2.8528051376 | | 2.8225338459 |
| **41** | 2.8678772449 | | 2.8424925804 |
| **42** | 2.8644523621 | | 2.8359205723 |
| **43** | 2.8736062050 | | 2.8290157318 |
| **44** | 2.8782746792 | | 2.8334860802 |
| **45** | 2.8528325558 | | 2.8312723637 |
| **46** | 2.8652703762 | | 2.8387947083 |
| **47** | 2.9196281433 | | 2.8204953671 |
| **48** | 2.8621973991 | | 2.8339309692 |
| **49** | 2.8979604244 | | 2.8442902565 |
| **50** | 2.8660171032 | | 2.8396911621 |
| **Total** | 144.2666068077 | | 143.2211732864 |
| **Average** | 2.8853321362 | | 2.8644234657 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **3** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.0721669197 | | 3.2621626854 |
| **2** | 2.9068534374 | | 2.8664927483 |
| **3** | 2.8768439293 | | 2.8644192219 |
| **4** | 2.8733510971 | | 2.8525459766 |
| **5** | 2.8871276379 | | 3.0001392365 |
| **6** | 2.8813140392 | | 2.8340468407 |
| **7** | 2.8807508945 | | 2.8342125416 |
| **8** | 2.8791410923 | | 2.8328673840 |
| **9** | 2.8884470463 | | 2.8617908955 |
| **10** | 2.8830480576 | | 2.8446104527 |
| **11** | 2.9136002064 | | 2.8438980579 |
| **12** | 2.8703346252 | | 2.8618276119 |
| **13** | 2.8993508816 | | 2.8526926041 |
| **14** | 2.8843560219 | | 2.8572235107 |
| **15** | 2.8964693546 | | 2.8553690910 |
| **16** | 2.8790071011 | | 2.8468015194 |
| **17** | 2.8998880386 | | 2.8500926495 |
| **18** | 2.8848831654 | | 2.8504936695 |
| **19** | 2.8792231083 | | 2.8625617027 |
| **20** | 2.8637197018 | | 2.8454549313 |
| **21** | 2.8759298325 | | 2.8512618542 |
| **22** | 2.8854787350 | | 2.8646776676 |
| **23** | 2.8828716278 | | 2.8553972244 |
| **24** | 3.0684297085 | | 2.8689751625 |
| **25** | 2.8980076313 | | 2.8593411446 |
| **26** | 2.9216384888 | | 2.8489081860 |
| **27** | 2.8923084736 | | 2.8591501713 |
| **28** | 2.8783276081 | | 2.8423590660 |
| **29** | 2.8970191479 | | 2.8563227654 |
| **30** | 2.9577703476 | | 2.8578836918 |
| **31** | 2.9555130005 | | 2.8536229134 |
| **32** | 2.8699719906 | | 2.8479197025 |
| **33** | 2.8721556664 | | 2.8548004627 |
| **34** | 2.8685932159 | | 2.8382885456 |
| **35** | 2.9177701473 | | 2.8467819691 |
| **36** | 2.8905313015 | | 2.8574738503 |
| **37** | 2.9181070328 | | 2.8550100327 |
| **38** | 2.9648425579 | | 2.8431711197 |
| **39** | 2.8810286522 | | 2.8440382481 |
| **40** | 2.9619455338 | | 2.8308544159 |
| **41** | 2.8725490570 | | 2.8450193405 |
| **42** | 2.8834018707 | | 2.8367576599 |
| **43** | 2.8836517334 | | 2.8459854126 |
| **44** | 2.8777606487 | | 2.8381652832 |
| **45** | 2.8727617264 | | 2.8444755077 |
| **46** | 2.8706107140 | | 2.8382549286 |
| **47** | 2.8847787380 | | 2.8370258808 |
| **48** | 2.9395136833 | | 2.8367908001 |
| **49** | 2.8696570396 | | 2.8516149521 |
| **50** | 2.8638131618 | | 2.8364024162 |
| **Total** | 144.9766154289 | | 143.0264337063 |
| **Average** | 2.8995323086 | | 2.8605286741 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **4** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.0460681915 | | 3.2079131603 |
| **2** | 2.9137098789 | | 2.8562896252 |
| **3** | 2.8814008236 | | 2.8579750061 |
| **4** | 2.8906726837 | | 2.8690547943 |
| **5** | 2.9073784351 | | 2.8588843346 |
| **6** | 2.8796112537 | | 2.8497338295 |
| **7** | 2.8845407963 | | 2.8505744934 |
| **8** | 2.8884441853 | | 2.8789739609 |
| **9** | 2.8747091293 | | 2.8443689346 |
| **10** | 2.8937995434 | | 2.8591578007 |
| **11** | 2.8829185963 | | 2.8536274433 |
| **12** | 2.8885464668 | | 2.8652074337 |
| **13** | 2.9324908257 | | 2.8658258915 |
| **14** | 3.0889074802 | | 2.8643603325 |
| **15** | 2.9029972553 | | 2.8696050644 |
| **16** | 2.8937258720 | | 2.8588085175 |
| **17** | 2.8840868473 | | 2.8458886147 |
| **18** | 2.8748009205 | | 2.8533220291 |
| **19** | 2.8554573059 | | 2.8351511955 |
| **20** | 2.8732640743 | | 2.8506083488 |
| **21** | 2.8719255924 | | 2.8535120487 |
| **22** | 2.8709585667 | | 2.8626255989 |
| **23** | 2.8635680676 | | 2.8512070179 |
| **24** | 2.8708481789 | | 2.8495631218 |
| **25** | 2.9316084385 | | 2.8453381062 |
| **26** | 2.8813128471 | | 2.8496575356 |
| **27** | 2.8814105988 | | 2.8603301048 |
| **28** | 2.8692760468 | | 2.8638970852 |
| **29** | 2.8718221188 | | 2.8652734756 |
| **30** | 2.8657562733 | | 2.8694109917 |
| **31** | 2.8782219887 | | 2.8623273373 |
| **32** | 2.8788843155 | | 2.8470537663 |
| **33** | 2.8737158775 | | 2.8403868675 |
| **34** | 2.8717272282 | | 2.8476412296 |
| **35** | 2.8754081726 | | 2.8469896317 |
| **36** | 2.9452266693 | | 2.8490152359 |
| **37** | 2.8636593819 | | 2.8461184502 |
| **38** | 2.9085342884 | | 2.8479812145 |
| **39** | 2.8707351685 | | 2.8427574635 |
| **40** | 2.8883285522 | | 2.8478913307 |
| **41** | 2.8670096397 | | 2.8348867893 |
| **42** | 2.8692216873 | | 2.8537595272 |
| **43** | 2.8654878139 | | 2.8342099190 |
| **44** | 2.8824956417 | | 2.8400793076 |
| **45** | 2.8712577820 | | 2.8423891068 |
| **46** | 2.8691849709 | | 2.8389070034 |
| **47** | 2.9321284294 | | 2.8309094906 |
| **48** | 2.8786537647 | | 2.8304998875 |
| **49** | 2.8724758625 | | 2.8381369114 |
| **50** | 2.8739500046 | | 2.8367500305 |
| **Total** | 144.5523245335 | | 142.9248363972 |
| **Average** | 2.8910464907 | | 2.8584967279 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **5** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.1784110069 | | 3.1661419868 |
| **2** | 2.8988523483 | | 2.8535478115 |
| **3** | 2.8738179207 | | 2.8509895802 |
| **4** | 2.8683359623 | | 2.8545069695 |
| **5** | 2.8909902573 | | 2.8436620235 |
| **6** | 2.8636419773 | | 2.8496038914 |
| **7** | 2.8684043884 | | 2.8543796539 |
| **8** | 2.8796339035 | | 2.8437263966 |
| **9** | 2.8747446537 | | 2.8542158604 |
| **10** | 2.8699040413 | | 2.8404705524 |
| **11** | 2.9158866405 | | 2.8685266972 |
| **12** | 2.8624179363 | | 2.8511364460 |
| **13** | 2.8982584476 | | 2.8487434387 |
| **14** | 2.8693356514 | | 2.8411531448 |
| **15** | 2.9203536510 | | 2.8451602459 |
| **16** | 2.8710031509 | | 2.8397202492 |
| **17** | 2.8725023270 | | 2.8509855270 |
| **18** | 2.9019534588 | | 2.8704018593 |
| **19** | 2.8680245876 | | 2.8588860035 |
| **20** | 2.8644959927 | | 2.8537073135 |
| **21** | 2.8765232563 | | 2.8714399338 |
| **22** | 2.8823337555 | | 2.8546035290 |
| **23** | 2.8579158783 | | 2.8598718643 |
| **24** | 2.9089791775 | | 2.8475611210 |
| **25** | 2.8773570061 | | 2.8427174091 |
| **26** | 2.9070653915 | | 2.8418359756 |
| **27** | 2.8645503521 | | 2.8455562592 |
| **28** | 2.8541421890 | | 2.8471903801 |
| **29** | 2.8566145897 | | 2.8360812664 |
| **30** | 2.8717665672 | | 2.8396065235 |
| **31** | 2.8578045368 | | 2.8566310406 |
| **32** | 2.8563828468 | | 2.8374791145 |
| **33** | 2.8665735722 | | 2.8249189854 |
| **34** | 2.8724009991 | | 2.8429548740 |
| **35** | 2.8765547276 | | 2.8388812542 |
| **36** | 2.8605310917 | | 2.8294456005 |
| **37** | 2.9043009281 | | 2.8559865952 |
| **38** | 2.8605363369 | | 2.8387408257 |
| **39** | 2.8813757896 | | 2.8459601402 |
| **40** | 2.8549251556 | | 2.8313381672 |
| **41** | 2.8571236134 | | 2.8260090351 |
| **42** | 2.8707056046 | | 2.8362057209 |
| **43** | 2.8559172153 | | 2.8362121582 |
| **44** | 2.8553981781 | | 2.8391833305 |
| **45** | 2.8696362972 | | 2.8392081261 |
| **46** | 2.9564175606 | | 2.8258588314 |
| **47** | 2.8529939651 | | 2.8308753967 |
| **48** | 2.8497140408 | | 2.8370606899 |
| **49** | 2.8525366783 | | 2.8448996544 |
| **50** | 2.9283947945 | | 2.8341007233 |
| **Total** | 144.1084403992 | | 142.5780801773 |
| **Average** | 2.8821688080 | | 2.8515616035 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **6** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.0276196003 | | 3.3853762150 |
| **2** | 2.9071137905 | | 2.9008176327 |
| **3** | 2.8893282413 | | 2.8706126213 |
| **4** | 2.8892846107 | | 2.8632392883 |
| **5** | 2.8977422714 | | 2.8738114834 |
| **6** | 2.8775081635 | | 2.8485693932 |
| **7** | 2.8707180023 | | 2.8373715878 |
| **8** | 2.8800470829 | | 2.8565881252 |
| **9** | 2.8845877647 | | 2.8543431759 |
| **10** | 2.8775281906 | | 2.8540968895 |
| **11** | 2.9373090267 | | 2.8634221554 |
| **12** | 2.8930621147 | | 2.8394751549 |
| **13** | 2.9070315361 | | 2.8798239231 |
| **14** | 2.8875713348 | | 2.8335812092 |
| **15** | 2.9196119308 | | 2.8468580246 |
| **16** | 2.8810083866 | | 2.8427405357 |
| **17** | 2.8817615509 | | 2.8478488922 |
| **18** | 2.8807821274 | | 2.8494875431 |
| **19** | 2.8817083836 | | 2.8501198292 |
| **20** | 2.8746912479 | | 2.8432569504 |
| **21** | 2.8814492226 | | 2.8497412205 |
| **22** | 2.8820750713 | | 2.8516573906 |
| **23** | 2.8891274929 | | 2.8484013081 |
| **24** | 2.8821527958 | | 2.8516790867 |
| **25** | 2.8808395863 | | 2.8619148731 |
| **26** | 2.9611158371 | | 2.8664259911 |
| **27** | 2.8735601902 | | 2.8639833927 |
| **28** | 2.8700089455 | | 2.8653059006 |
| **29** | 2.8717622757 | | 2.8547372818 |
| **30** | 2.8605358601 | | 2.8362376690 |
| **31** | 2.8673996925 | | 2.8429548740 |
| **32** | 2.8749032021 | | 2.8453655243 |
| **33** | 2.8661022186 | | 2.8356385231 |
| **34** | 2.8841373920 | | 2.8542418480 |
| **35** | 2.8743560314 | | 2.8562819958 |
| **36** | 2.8878576756 | | 2.8510694504 |
| **37** | 2.9485230446 | | 2.8532805443 |
| **38** | 2.8647921085 | | 2.8404574394 |
| **39** | 2.8736846447 | | 2.8666112423 |
| **40** | 2.8815550804 | | 2.8258278370 |
| **41** | 2.8767271042 | | 2.8433084488 |
| **42** | 2.8680713177 | | 2.8259146214 |
| **43** | 2.8664472103 | | 2.8403122425 |
| **44** | 2.8793058395 | | 2.8302419186 |
| **45** | 2.8770360947 | | 2.8374032974 |
| **46** | 2.8721969128 | | 2.8379914761 |
| **47** | 2.8738956451 | | 2.8502910137 |
| **48** | 2.9513807297 | | 2.8334403038 |
| **49** | 2.8804810047 | | 2.8619332314 |
| **50** | 2.8828575611 | | 2.8331615925 |
| **Total** | 144.4503531456 | | 143.0572521687 |
| **Average** | 2.8890070629 | | 2.8611450434 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **7** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.0292792320 | | 3.4943017960 |
| **2** | 2.8961827755 | | 3.1463763714 |
| **3** | 2.8910479546 | | 2.9509868622 |
| **4** | 2.8829448223 | | 2.8934359550 |
| **5** | 2.8665001392 | | 2.8477559090 |
| **6** | 2.8751513958 | | 2.8331160545 |
| **7** | 2.8847162724 | | 2.8412742615 |
| **8** | 2.8814127445 | | 2.8297669888 |
| **9** | 2.8800234795 | | 2.8697948456 |
| **10** | 2.9060375690 | | 2.8553960323 |
| **11** | 3.0088031292 | | 2.8381016254 |
| **12** | 2.8809216022 | | 2.8319077492 |
| **13** | 2.9010386467 | | 2.8581929207 |
| **14** | 2.9479219913 | | 2.8368806839 |
| **15** | 2.8961677551 | | 2.8336517811 |
| **16** | 2.8768801689 | | 2.8342185020 |
| **17** | 2.8815069199 | | 2.8385562897 |
| **18** | 2.9003520012 | | 2.8573980331 |
| **19** | 2.8665480614 | | 2.8333220482 |
| **20** | 2.9133849144 | | 2.8412578106 |
| **21** | 2.8636209965 | | 2.8572905064 |
| **22** | 2.8707139492 | | 2.8376448154 |
| **23** | 2.8669419289 | | 2.8375544548 |
| **24** | 2.8671500683 | | 2.8318996429 |
| **25** | 2.8645255566 | | 2.8306984901 |
| **26** | 2.9408974648 | | 2.8474910259 |
| **27** | 2.8686957359 | | 2.8424830437 |
| **28** | 2.9456419945 | | 2.8645687103 |
| **29** | 2.8594074249 | | 2.8549416065 |
| **30** | 2.8786106110 | | 2.8429648876 |
| **31** | 2.8686196804 | | 2.8597500324 |
| **32** | 2.8706462383 | | 2.8860673904 |
| **33** | 2.8674290180 | | 2.8450968266 |
| **34** | 2.8760163784 | | 2.8404474258 |
| **35** | 2.8796510696 | | 2.8482210636 |
| **36** | 2.8637146950 | | 2.8616631031 |
| **37** | 2.9323947430 | | 2.8576571941 |
| **38** | 2.8971836567 | | 2.8524444103 |
| **39** | 2.8549914360 | | 2.8420565128 |
| **40** | 2.8636610508 | | 2.8495571613 |
| **41** | 2.8541016579 | | 2.8160836697 |
| **42** | 2.8561947346 | | 2.8275809288 |
| **43** | 2.8731317520 | | 2.8441317081 |
| **44** | 2.8671708107 | | 2.8663172722 |
| **45** | 2.8541142941 | | 2.8246517181 |
| **46** | 2.8661673069 | | 2.8248553276 |
| **47** | 2.8701574802 | | 2.8195569515 |
| **48** | 2.9432005882 | | 2.8307418823 |
| **49** | 2.8710839748 | | 2.8291060925 |
| **50** | 2.8653028011 | | 2.8229308128 |
| **Total** | 144.3879606724 | | 143.2621471882 |
| **Average** | 2.8877592134 | | 2.8652429438 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **8** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.0431563854 | | 3.5202591419 |
| **2** | 2.9256265163 | | 2.9819314480 |
| **3** | 2.8940632343 | | 2.9180653095 |
| **4** | 2.8764975071 | | 2.8787610531 |
| **5** | 2.9109733105 | | 2.8931963444 |
| **6** | 2.9000422955 | | 3.2118742466 |
| **7** | 2.8766512871 | | 3.2129378319 |
| **8** | 2.8754317760 | | 3.2515366077 |
| **9** | 2.8774223328 | | 3.2127575874 |
| **10** | 2.8909950256 | | 3.2247667313 |
| **11** | 2.9132523537 | | 3.2343809605 |
| **12** | 2.8908431530 | | 3.2607574463 |
| **13** | 2.8880438805 | | 3.2208199501 |
| **14** | 2.8959772587 | | 3.2159664631 |
| **15** | 2.8912913799 | | 3.1215269566 |
| **16** | 2.8694293499 | | 2.8678328991 |
| **17** | 2.8874149323 | | 2.8539390564 |
| **18** | 2.8705804348 | | 2.8684637547 |
| **19** | 2.8772513866 | | 2.8537285328 |
| **20** | 2.8661191463 | | 2.8623456955 |
| **21** | 2.8660042286 | | 2.8750534058 |
| **22** | 2.8721435070 | | 2.8737256527 |
| **23** | 2.9558334351 | | 2.8658881187 |
| **24** | 2.8833301067 | | 2.8811321259 |
| **25** | 2.8614816666 | | 2.8721625805 |
| **26** | 2.9466536045 | | 2.8742434978 |
| **27** | 2.8656144142 | | 2.8739008904 |
| **28** | 2.8714287281 | | 2.8784995079 |
| **29** | 2.8690788746 | | 2.8692471981 |
| **30** | 2.8825392723 | | 2.8810162544 |
| **31** | 2.8623058796 | | 2.8625023365 |
| **32** | 2.8775174618 | | 2.8670141697 |
| **33** | 2.8767375946 | | 2.8605563641 |
| **34** | 2.8793597221 | | 2.8700411320 |
| **35** | 2.8631486893 | | 2.8599934578 |
| **36** | 2.8689193726 | | 2.9941890240 |
| **37** | 2.9587395191 | | 2.8621017933 |
| **38** | 2.8759529591 | | 2.8582594395 |
| **39** | 2.8778641224 | | 2.8472485542 |
| **40** | 2.8755936623 | | 2.8390445709 |
| **41** | 2.8683004379 | | 2.8348889351 |
| **42** | 2.8660950661 | | 2.8579053879 |
| **43** | 2.8732016087 | | 2.8321757317 |
| **44** | 2.8709700108 | | 2.8531990051 |
| **45** | 2.8587641716 | | 2.8331475258 |
| **46** | 2.8830597401 | | 2.8602006435 |
| **47** | 2.8862895966 | | 2.8346536160 |
| **48** | 2.9413454533 | | 2.8540401459 |
| **49** | 2.8634536266 | | 2.8391826153 |
| **50** | 2.8640956879 | | 2.8447864056 |
| **Total** | 144.3868851662 | | 147.5758481026 |
| **Average** | 2.8877377033 | | 2.9515169621 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **9** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.0393879414 | | 3.1962261200 |
| **2** | 2.9059808254 | | 2.8561971188 |
| **3** | 2.8680372238 | | 2.8224849701 |
| **4** | 2.8756139278 | | 2.8391366005 |
| **5** | 2.9008541107 | | 2.8343544006 |
| **6** | 2.8742222786 | | 2.8454725742 |
| **7** | 2.8793776035 | | 2.8372023106 |
| **8** | 2.8796396255 | | 2.8266389370 |
| **9** | 2.8920083046 | | 2.8669240475 |
| **10** | 2.8801219463 | | 2.8218030930 |
| **11** | 2.9274561405 | | 2.8385560513 |
| **12** | 2.8816168308 | | 2.8361392021 |
| **13** | 2.9132015705 | | 2.8356788158 |
| **14** | 2.8783354759 | | 2.8342602253 |
| **15** | 2.8999836445 | | 2.8442101479 |
| **16** | 2.8733127117 | | 2.8432893753 |
| **17** | 2.8624820709 | | 2.8343908787 |
| **18** | 2.8675863743 | | 2.8273246288 |
| **19** | 2.8609499931 | | 2.8307232857 |
| **20** | 2.8529040813 | | 2.8233563900 |
| **21** | 2.8522751331 | | 2.8354203701 |
| **22** | 2.8705294132 | | 2.8446502686 |
| **23** | 2.8658463955 | | 2.8252742290 |
| **24** | 2.9090926647 | | 2.8453016281 |
| **25** | 2.8725602627 | | 2.8312962055 |
| **26** | 2.8810245991 | | 2.8132259846 |
| **27** | 2.8464601040 | | 2.8052523136 |
| **28** | 2.8548758030 | | 2.8254842758 |
| **29** | 2.8658070564 | | 2.8555696011 |
| **30** | 2.8710734844 | | 2.8199007511 |
| **31** | 2.8630251884 | | 2.8343737125 |
| **32** | 2.8578224182 | | 2.8347790241 |
| **33** | 2.9426198006 | | 2.8228802681 |
| **34** | 2.9683063030 | | 2.8363277912 |
| **35** | 2.8638169765 | | 2.8222455978 |
| **36** | 2.8572251797 | | 2.8336827755 |
| **37** | 2.9261777401 | | 2.8449368477 |
| **38** | 2.8555300236 | | 2.8209486008 |
| **39** | 2.8512861729 | | 2.8297648430 |
| **40** | 2.8798327446 | | 2.8038711548 |
| **41** | 2.8779854774 | | 2.8219377995 |
| **42** | 2.8853707314 | | 2.8161761761 |
| **43** | 2.8722085953 | | 2.8199946880 |
| **44** | 2.8513360023 | | 2.8218677044 |
| **45** | 2.8724503517 | | 2.8198518753 |
| **46** | 2.8604996204 | | 2.8275964260 |
| **47** | 2.8703250885 | | 2.8119378090 |
| **48** | 2.9016282558 | | 2.8100888729 |
| **49** | 2.8637378216 | | 2.8287465572 |
| **50** | 2.8620960712 | | 2.8183882236 |
| **Total** | 144.0858981609 | | 141.8761415482 |
| **Average** | 2.8817179632 | | 2.8375228310 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **10** | |
| **Resolution** | | **2160p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 3.0843296051 | | 3.5016789436 |
| **2** | 2.9737806320 | | 2.9823117256 |
| **3** | 2.9645369053 | | 2.8742482662 |
| **4** | 2.9226815701 | | 2.8554069996 |
| **5** | 2.9438507557 | | 2.8606824875 |
| **6** | 2.9803264141 | | 2.8319697380 |
| **7** | 3.0294721127 | | 2.8348231316 |
| **8** | 2.9178555012 | | 2.8721899986 |
| **9** | 2.9214167595 | | 2.8530266285 |
| **10** | 2.9198644161 | | 2.8512740135 |
| **11** | 2.9684593678 | | 2.8362395763 |
| **12** | 2.9153306484 | | 2.8415415287 |
| **13** | 3.0446650982 | | 2.8769090176 |
| **14** | 3.0053296089 | | 2.8370585442 |
| **15** | 2.9258053303 | | 2.9627184868 |
| **16** | 2.9283397198 | | 2.8341467381 |
| **17** | 2.9268615246 | | 2.8485426903 |
| **18** | 2.9264483452 | | 2.8308670521 |
| **19** | 2.9205281734 | | 2.8318078518 |
| **20** | 2.9185335636 | | 2.8575863838 |
| **21** | 2.9386966228 | | 2.8302888870 |
| **22** | 2.9212040901 | | 2.8383829594 |
| **23** | 2.9170260429 | | 2.8271880150 |
| **24** | 2.9154689312 | | 2.8350057602 |
| **25** | 2.9950635433 | | 2.8429281712 |
| **26** | 2.9163458347 | | 2.9666373730 |
| **27** | 2.9275722504 | | 2.8404002190 |
| **28** | 2.9167811871 | | 2.8430869579 |
| **29** | 2.9250326157 | | 2.8446459770 |
| **30** | 2.8997285366 | | 2.8261387348 |
| **31** | 2.9502432346 | | 2.8713896275 |
| **32** | 2.9046649933 | | 2.8349969387 |
| **33** | 2.9105687141 | | 2.8370738029 |
| **34** | 2.9198036194 | | 2.8263778687 |
| **35** | 2.9114222527 | | 2.8501667976 |
| **36** | 3.0182268620 | | 2.8549699783 |
| **37** | 2.9382834435 | | 2.8434987068 |
| **38** | 2.9595746994 | | 2.8285503387 |
| **39** | 2.9915304184 | | 2.8384499550 |
| **40** | 2.9391932487 | | 2.8289623260 |
| **41** | 2.9375288486 | | 2.8476848602 |
| **42** | 2.9356207848 | | 2.8369300365 |
| **43** | 2.9374222755 | | 2.8244416714 |
| **44** | 2.9404749870 | | 2.8196883202 |
| **45** | 2.9316880703 | | 2.8252584934 |
| **46** | 2.9376518726 | | 2.8247647285 |
| **47** | 2.9989461899 | | 2.8362352848 |
| **48** | 2.9527456760 | | 2.8167760372 |
| **49** | 2.9326424599 | | 2.8492314816 |
| **50** | 2.9267857075 | | 2.8276536465 |
| **Total** | 147.2863540649 | | 143.0928337574 |
| **Average** | 2.9457270813 | | 2.8618566751 |