

[Click Here](#)



Data quality is the key to success for any organization. If you don't have good data, you're essentially flying blind. Before you know it, productivity takes a hit, systems fail, and costs start to soar. IBM uncovered that poor data quality carries an annual price tag of \$3.1 trillion for the U.S. economy. To combat these issues and boost your data quality, one of the most effective strategies is data normalization. Data normalization is the process of structuring a database by eliminating redundancy, organizing data efficiently, and ensuring data integrity. It standardizes data across various fields, from databases to data analysis and machine learning, improving accuracy and consistency. In this guide, we'll break down the complex concept of data normalization and explore its types and applications to help you handle your data more effectively. But first, let's begin by discussing data anomalies. Data Normalization: Understanding The Basics Data normalization is an important aspect of data management and analysis that plays a crucial role in both data storage and data analysis. It is a systematic approach to decompose data tables to eliminate redundant data and undesirable characteristics. The primary goal of data normalization is to add, delete, and modify data without causing data inconsistencies. It ensures that each data item is stored in only one place which reduces the overall disk space requirement and improves the consistency and reliability of the system. In databases, it organizes fields and tables in data analysis and machine learning, normalization is used to preprocess data before being used in any analysis. Who Needs Data Normalization? Data normalization has applications in a wide array of fields and professions. Its ability to streamline data storage, reduce data input error, and ensure consistency makes it an invaluable asset for anyone dealing with large datasets. Lets discuss some of its use cases. Data Normalization In Machine Learning Data normalization is a standard preprocessing step in machine learning. ML engineers use it to standardize and scale their data which is very important to ensure that every feature has an equal impact on the prediction. Data Normalization In Research Researchers, particularly those in the field of science and engineering, often use data normalization in their work. Whether they're dealing with experimental data or large datasets, normalization helps to simplify their data, making it easier to analyze and interpret. They use it to minimize potential distortions caused by differing scales or units and ensure that their findings are accurate and reliable. Data Normalization In Business In the business world, data normalization is often used in business intelligence and decision-making. Business analysts use normalization to prepare data for analysis, helping them to identify trends, make comparisons, and draw meaningful conclusions. This helps in more informed business decisions and strategies to drive growth and success. Normalization also improves data consistency which results in better collaboration between different teams within the company. Understanding Data Anomalies (Causes and Effects) What Are Data Anomalies? Data anomalies refer to inconsistencies or errors that occur when you deal with stored data. These anomalies can compromise the integrity of the data and cause inaccuracies that do not reflect the real-world scenario the data is meant to represent. In databases, anomalies are typically because of redundancy or poor table structure. In data analysis and machine learning, anomalies can arise from missing values, incorrect data types, or unrealistic values. Regardless of the context, anomalies can significantly impact the consistency and integrity of data. They can cause inaccurate analyses, misleading results, and poor decision-making. Therefore, identifying and addressing data anomalies is a crucial step in any data-driven process. Causes and Effects of Data Anomalies Data anomalies can be categorized based on their causes and their impact. They primarily affect databases and data analysis/machine learning systems, leading to inefficiencies and unreliable outputs. Each type can disrupt data consistency and affect operations. Exploring Data Anomalies: A Focus on Databases, Data Analysis & Machine Learning Data anomalies can originate from a range of sources and their impact can vary, often causing substantial complications if not addressed properly. Lets talk about 2 broad categories where these anomalies are most prevalent and can cause major issues. 1. Anomalies In Databases Source When it comes to databases, 3 primary types of data anomalies result from update, insertion, and deletion operations. Insertion anomalies: These occur when the addition of new data to the database is hindered because of the absence of other necessary data. This situation often arises in systems where specific dependencies between data elements exist. Update anomalies: This type of anomalies happen when modifications to the data end up causing inconsistencies. This usually occurs when the same piece of data is stored in multiple locations and changes aren't reflected uniformly across all instances. Deletion anomalies: You encounter these anomalies when you unintentionally lose other valuable information while removing certain data. This typically happens when multiple pieces of information are stored together and the deletion of one affects the others. While the above anomalies are mainly related to the operations in databases and their design flaws, understand that anomalies are not limited to these aspects alone. They can very well be present in the data itself and can be a source of misleading analysis and interpretations. Lets discuss these next. 2. Anomalies In Data Analysis & Machine Learning In data analysis and machine learning, data anomalies can manifest as discrepancies in the values, types, or completeness of data which can significantly impact the outcome of analyses or predictive models. Lets examine some of the key anomalies that occur in this context: Missing values: These happen when data is not available for certain observations or variables. Incorrect data types: These anomalies occur when the data type of a variable does not match the expected data type. For example, a numeric variable might be recorded as a string. Unrealistic values: This type of anomaly arises when variables contain values that are not physically possible or realistic. For example, a variable representing human age might contain a value of 200. How Data Normalization Solves Data Anomalies Data normalization plays a crucial role in preventing, managing, and resolving anomalies by structuring data efficiently and enforcing integrity constraints. By standardizing data structures, eliminating redundancies, and enforcing data integrity, normalization ensures that databases and datasets are reliable and efficient for processing. Next, let's explore the structured process of data normalization and how it prevents these issues. 4 Types Of Data Normalization In Databases Source Data normalization in databases is a multi-stage process that involves the application of a series of rules known as "normal forms". Each normal form represents a level of normalization and comes with its own set of conditions that a database should meet. These normal forms give a set of rules that a database should adhere to for achieving a certain level of normalization. The process starts with the first normal form (1NF) and can go up to the fifth normal form (5NF), each level addressing a specific type of data redundancy or anomaly. Lets take a look at each one of them. 1. First Normal Form (1NF) The first normal form (1NF) is the foundational step of data normalization. A database is in 1NF if it contains only atomic values (each field holds a single value, no lists or arrays). Every record is unique and identified by a primary key. There are no repeating groups of data within a row. This stage eliminates duplicate data and ensures that each entry in the database has a unique identifier, enhancing data consistency. Example of 1NF Violation & Solution Consider an E-commerce Order Table, using an online retail to track purchases. Customers often buy multiple products in one order, which leads to multiple values in a single field. This complicates retrieval and analysis since extracting individual products requires extra processing. Normalization restructures the data for efficient querying and ensures data integrity. Order_ID | Customer_Name | Products Ordered | 1001 | John Doe | Laptop, Mouse | 1002 | Jane Smith | Phone, Headphones | 2000 | John Doe | Laptop, Mouse | 1003 | John Doe | Laptop, Mouse | 1004 | John Doe | Laptop, Mouse | 1005 | John Doe | Laptop, Mouse | 1006 | John Doe | Laptop, Mouse | 1007 | John Doe | Laptop, Mouse | 1008 | John Doe | Laptop, Mouse | 1009 | John Doe | Laptop, Mouse | 1010 | John Doe | Laptop, Mouse | 1011 | John Doe | Laptop, Mouse | 1012 | John Doe | Laptop, Mouse | 1013 | John Doe | Laptop, Mouse | 1014 | John Doe | Laptop, Mouse | 1015 | John Doe | Laptop, Mouse | 1016 | John Doe | Laptop, Mouse | 1017 | John Doe | Laptop, Mouse | 1018 | John Doe | Laptop, Mouse | 1019 | John Doe | Laptop, Mouse | 1020 | John Doe | Laptop, Mouse | 1021 | John Doe | Laptop, Mouse | 1022 | John Doe | Laptop, Mouse | 1023 | John Doe | Laptop, Mouse | 1024 | John Doe | Laptop, Mouse | 1025 | John Doe | Laptop, Mouse | 1026 | John Doe | Laptop, Mouse | 1027 | John Doe | Laptop, Mouse | 1028 | John Doe | Laptop, Mouse | 1029 | John Doe | Laptop, Mouse | 1030 | John Doe | Laptop, Mouse | 1031 | John Doe | Laptop, Mouse | 1032 | John Doe | Laptop, Mouse | 1033 | John Doe | Laptop, Mouse | 1034 | John Doe | Laptop, Mouse | 1035 | John Doe | Laptop, Mouse | 1036 | John Doe | Laptop, Mouse | 1037 | John Doe | Laptop, Mouse | 1038 | John Doe | Laptop, Mouse | 1039 | John Doe | Laptop, Mouse | 1040 | John Doe | Laptop, Mouse | 1041 | John Doe | Laptop, Mouse | 1042 | John Doe | Laptop, Mouse | 1043 | John Doe | Laptop, Mouse | 1044 | John Doe | Laptop, Mouse | 1045 | John Doe | Laptop, Mouse | 1046 | John Doe | Laptop, Mouse | 1047 | John Doe | Laptop, Mouse | 1048 | John Doe | Laptop, Mouse | 1049 | John Doe | Laptop, Mouse | 1050 | John Doe | Laptop, Mouse | 1051 | John Doe | Laptop, Mouse | 1052 | John Doe | Laptop, Mouse | 1053 | John Doe | Laptop, Mouse | 1054 | John Doe | Laptop, Mouse | 1055 | John Doe | Laptop, Mouse | 1056 | John Doe | Laptop, Mouse | 1057 | John Doe | Laptop, Mouse | 1058 | John Doe | Laptop, Mouse | 1059 | John Doe | Laptop, Mouse | 1060 | John Doe | Laptop, Mouse | 1061 | John Doe | Laptop, Mouse | 1062 | John Doe | Laptop, Mouse | 1063 | John Doe | Laptop, Mouse | 1064 | John Doe | Laptop, Mouse | 1065 | John Doe | Laptop, Mouse | 1066 | John Doe | Laptop, Mouse | 1067 | John Doe | Laptop, Mouse | 1068 | John Doe | Laptop, Mouse | 1069 | John Doe | Laptop, Mouse | 1070 | John Doe | Laptop, Mouse | 1071 | John Doe | Laptop, Mouse | 1072 | John Doe | Laptop, Mouse | 1073 | John Doe | Laptop, Mouse | 1074 | John Doe | Laptop, Mouse | 1075 | John Doe | Laptop, Mouse | 1076 | John Doe | Laptop, Mouse | 1077 | John Doe | Laptop, Mouse | 1078 | John Doe | Laptop, Mouse | 1079 | John Doe | Laptop, Mouse | 1080 | John Doe | Laptop, Mouse | 1081 | John Doe | Laptop, Mouse | 1082 | John Doe | Laptop, Mouse | 1083 | John Doe | Laptop, Mouse | 1084 | John Doe | Laptop, Mouse | 1085 | John Doe | Laptop, Mouse | 1086 | John Doe | Laptop, Mouse | 1087 | John Doe | Laptop, Mouse | 1088 | John Doe | Laptop, Mouse | 1089 | John Doe | Laptop, Mouse | 1090 | John Doe | Laptop, Mouse | 1091 | John Doe | Laptop, Mouse | 1092 | John Doe | Laptop, Mouse | 1093 | John Doe | Laptop, Mouse | 1094 | John Doe | Laptop, Mouse | 1095 | John Doe | Laptop, Mouse | 1096 | John Doe | Laptop, Mouse | 1097 | John Doe | Laptop, Mouse | 1098 | John Doe | Laptop, Mouse | 1099 | John Doe | Laptop, Mouse | 1100 | John Doe | Laptop, Mouse | 1101 | John Doe | Laptop, Mouse | 1102 | John Doe | Laptop, Mouse | 1103 | John Doe | Laptop, Mouse | 1104 | John Doe | Laptop, Mouse | 1105 | John Doe | Laptop, Mouse | 1106 | John Doe | Laptop, Mouse | 1107 | John Doe | Laptop, Mouse | 1108 | John Doe | Laptop, Mouse | 1109 | John Doe | Laptop, Mouse | 1110 | John Doe | Laptop, Mouse | 1111 | John Doe | Laptop, Mouse | 1112 | John Doe | Laptop, Mouse | 1113 | John Doe | Laptop, Mouse | 1114 | John Doe | Laptop, Mouse | 1115 | John Doe | Laptop, Mouse | 1116 | John Doe | Laptop, Mouse | 1117 | John Doe | Laptop, Mouse | 1118 | John Doe | Laptop, Mouse | 1119 | John Doe | Laptop, Mouse | 1120 | John Doe | Laptop, Mouse | 1121 | John Doe | Laptop, Mouse | 1122 | John Doe | Laptop, Mouse | 1123 | John Doe | Laptop, Mouse | 1124 | John Doe | Laptop, Mouse | 1125 | John Doe | Laptop, Mouse | 1126 | John Doe | Laptop, Mouse | 1127 | John Doe | Laptop, Mouse | 1128 | John Doe | Laptop, Mouse | 1129 | John Doe | Laptop, Mouse | 1130 | John Doe | Laptop, Mouse | 1131 | John Doe | Laptop, Mouse | 1132 | John Doe | Laptop, Mouse | 1133 | John Doe | Laptop, Mouse | 1134 | John Doe | Laptop, Mouse | 1135 | John Doe | Laptop, Mouse | 1136 | John Doe | Laptop, Mouse | 1137 | John Doe | Laptop, Mouse | 1138 | John Doe | Laptop, Mouse | 1139 | John Doe | Laptop, Mouse | 1140 | John Doe | Laptop, Mouse | 1141 | John Doe | Laptop, Mouse | 1142 | John Doe | Laptop, Mouse | 1143 | John Doe | Laptop, Mouse | 1144 | John Doe | Laptop, Mouse | 1145 | John Doe | Laptop, Mouse | 1146 | John Doe | Laptop, Mouse | 1147 | John Doe | Laptop, Mouse | 1148 | John Doe | Laptop, Mouse | 1149 | John Doe | Laptop, Mouse | 1150 | John Doe | Laptop, Mouse | 1151 | John Doe | Laptop, Mouse | 1152 | John Doe | Laptop, Mouse | 1153 | John Doe | Laptop, Mouse | 1154 | John Doe | Laptop, Mouse | 1155 | John Doe | Laptop, Mouse | 1156 | John Doe | Laptop, Mouse | 1157 | John Doe | Laptop, Mouse | 1158 | John Doe | Laptop, Mouse | 1159 | John Doe | Laptop, Mouse | 1160 | John Doe | Laptop, Mouse | 1161 | John Doe | Laptop, Mouse | 1162 | John Doe | Laptop, Mouse | 1163 | John Doe | Laptop, Mouse | 1164 | John Doe | Laptop, Mouse | 1165 | John Doe | Laptop, Mouse | 1166 | John Doe | Laptop, Mouse | 1167 | John Doe | Laptop, Mouse | 1168 | John Doe | Laptop, Mouse | 1169 | John Doe | Laptop, Mouse | 1170 | John Doe | Laptop, Mouse | 1171 | John Doe | Laptop, Mouse | 1172 | John Doe | Laptop, Mouse | 1173 | John Doe | Laptop, Mouse | 1174 | John Doe | Laptop, Mouse | 1175 | John Doe | Laptop, Mouse | 1176 | John Doe | Laptop, Mouse | 1177 | John Doe | Laptop, Mouse | 1178 | John Doe | Laptop, Mouse | 1179 | John Doe | Laptop, Mouse | 1180 | John Doe | Laptop, Mouse | 1181 | John Doe | Laptop, Mouse | 1182 | John Doe | Laptop, Mouse | 1183 | John Doe | Laptop, Mouse | 1184 | John Doe | Laptop, Mouse | 1185 | John Doe | Laptop, Mouse | 1186 | John Doe | Laptop, Mouse | 1187 | John Doe | Laptop, Mouse | 1188 | John Doe | Laptop, Mouse | 1189 | John Doe | Laptop, Mouse | 1190 | John Doe | Laptop, Mouse | 1191 | John Doe | Laptop, Mouse | 1192 | John Doe | Laptop, Mouse | 1193 | John Doe | Laptop, Mouse | 1194 | John Doe | Laptop, Mouse | 1195 | John Doe | Laptop, Mouse | 1196 | John Doe | Laptop, Mouse | 1197 | John Doe | Laptop, Mouse | 1198 | John Doe | Laptop, Mouse | 1199 | John Doe | Laptop, Mouse | 1200 | John Doe | Laptop, Mouse | 1201 | John Doe | Laptop, Mouse | 1202 | John Doe | Laptop, Mouse | 1203 | John Doe | Laptop, Mouse | 1204 | John Doe | Laptop, Mouse | 1205 | John Doe | Laptop, Mouse | 1206 | John Doe | Laptop, Mouse | 1207 | John Doe | Laptop, Mouse | 1208 | John Doe | Laptop, Mouse | 1209 | John Doe | Laptop, Mouse | 1210 | John Doe | Laptop, Mouse | 1211 | John Doe | Laptop, Mouse | 1212 | John Doe | Laptop, Mouse | 1213 | John Doe | Laptop, Mouse | 1214 | John Doe | Laptop, Mouse | 1215 | John Doe | Laptop, Mouse | 1216 | John Doe | Laptop, Mouse | 1217 | John Doe | Laptop, Mouse | 1218 | John Doe | Laptop, Mouse | 1219 | John Doe | Laptop, Mouse | 1220 | John Doe | Laptop, Mouse | 1221 | John Doe | Laptop, Mouse | 1222 | John Doe | Laptop, Mouse | 1223 | John Doe | Laptop, Mouse | 1224 | John Doe | Laptop, Mouse | 1225 | John Doe | Laptop, Mouse | 1226 | John Doe | Laptop, Mouse | 1227 | John Doe | Laptop, Mouse | 1228 | John Doe | Laptop, Mouse | 1229 | John Doe | Laptop, Mouse | 1230 | John Doe | Laptop, Mouse | 1231 | John Doe | Laptop, Mouse | 1232 | John Doe | Laptop, Mouse | 1233 | John Doe | Laptop, Mouse | 1234 | John Doe | Laptop, Mouse | 1235 | John Doe | Laptop, Mouse | 1236 | John Doe | Laptop, Mouse | 1237 | John Doe | Laptop, Mouse | 1238 | John Doe | Laptop, Mouse | 1239 | John Doe | Laptop, Mouse | 1240 | John Doe | Laptop, Mouse | 1241 | John Doe | Laptop, Mouse | 1242 | John Doe | Laptop, Mouse | 1243 | John Doe | Laptop, Mouse | 1244 | John Doe | Laptop, Mouse | 1245 | John Doe | Laptop, Mouse | 1246 | John Doe | Laptop, Mouse | 1247 | John Doe | Laptop, Mouse | 1248 | John Doe | Laptop, Mouse | 1249 | John Doe | Laptop, Mouse | 1250 | John Doe | Laptop, Mouse | 1251 | John Doe | Laptop, Mouse | 1252 | John Doe | Laptop, Mouse | 1253 | John Doe | Laptop, Mouse | 1254 | John Doe | Laptop, Mouse | 1255 | John Doe | Laptop, Mouse | 1256 | John Doe | Laptop, Mouse | 1257 | John Doe | Laptop, Mouse | 1258 | John Doe | Laptop, Mouse | 1259 | John Doe | Laptop, Mouse | 1260 | John Doe | Laptop, Mouse | 1261 | John Doe | Laptop, Mouse | 1262 | John Doe | Laptop, Mouse | 1263 | John Doe | Laptop, Mouse | 1264 | John Doe | Laptop, Mouse | 1265 | John Doe | Laptop, Mouse | 1266 | John Doe | Laptop, Mouse | 1267 | John Doe | Laptop, Mouse | 1268 | John Doe | Laptop, Mouse | 1269 | John Doe | Laptop, Mouse | 1270 | John Doe | Laptop, Mouse | 1271 | John Doe | Laptop, Mouse | 1272 | John Doe | Laptop, Mouse | 1273 | John Doe | Laptop, Mouse | 1274 | John Doe | Laptop, Mouse | 1275 | John Doe | Laptop, Mouse | 1276 | John Doe | Laptop, Mouse | 1277 | John Doe | Laptop, Mouse | 1278 | John Doe | Laptop, Mouse | 1279 | John Doe | Laptop, Mouse | 1280 | John Doe | Laptop, Mouse | 1281 | John Doe | Laptop, Mouse | 1282 | John Doe | Laptop, Mouse | 1283 | John Doe | Laptop, Mouse | 1284 | John Doe | Laptop, Mouse | 1285 | John Doe | Laptop, Mouse | 1286 | John Doe | Laptop, Mouse | 1287 | John Doe | Laptop, Mouse | 1288 | John Doe | Laptop, Mouse | 1289 | John Doe | Laptop, Mouse | 1290 | John Doe | Laptop, Mouse | 1291 | John Doe | Laptop, Mouse | 1292 | John Doe | Laptop, Mouse | 1293 | John Doe | Laptop, Mouse | 1294 | John Doe | Laptop, Mouse | 1295 | John Doe | Laptop, Mouse | 1296 | John Doe | Laptop, Mouse | 1297 | John Doe | Laptop, Mouse | 1298 | John Doe | Laptop, Mouse | 1299 | John Doe | Laptop, Mouse | 1300 | John Doe | Laptop, Mouse | 1301 | John Doe | Laptop, Mouse | 1302 | John Doe | Laptop, Mouse | 1303 | John Doe | Laptop, Mouse | 1304 | John Doe | Laptop, Mouse | 1305 | John Doe | Laptop, Mouse | 1306 | John Doe | Laptop, Mouse | 1307 | John Doe | Laptop, Mouse | 1308 | John Doe | Laptop, Mouse | 1309 | John Doe | Laptop, Mouse | 1310 | John Doe | Laptop, Mouse | 1311 | John Doe | Laptop, Mouse | 1312 | John Doe | Laptop, Mouse | 1313 | John Doe | Laptop, Mouse | 1314 | John Doe | Laptop, Mouse | 1315 | John Doe | Laptop, Mouse | 1316 | John Doe | Laptop, Mouse | 1317 | John Doe | Laptop, Mouse | 1318 | John Doe | Laptop, Mouse | 1319 | John Doe | Laptop, Mouse | 1320 | John Doe | Laptop, Mouse | 1321 | John Doe | Laptop, Mouse | 1322 | John Doe | Laptop, Mouse | 1323 | John Doe | Laptop, Mouse | 1324 | John Doe | Laptop, Mouse | 1325 | John Doe | Laptop, Mouse | 1326 | John Doe | Laptop, Mouse | 1327 | John Doe | Laptop, Mouse | 1328 | John Doe | Laptop, Mouse | 1329 | John Doe | Laptop, Mouse | 1330 | John Doe | Laptop, Mouse | 1331 | John Doe | Laptop, Mouse | 1332 | John Doe | Laptop, Mouse | 1333 | John Doe | Laptop, Mouse | 1334 | John Doe | Laptop, Mouse | 1335 | John Doe | Laptop, Mouse | 1336 | John Doe | Laptop, Mouse | 1337 | John Doe | Laptop, Mouse | 1338 | John Doe | Laptop, Mouse | 1339 | John Doe | Laptop, Mouse | 1340 | John Doe | Laptop, Mouse | 1341 | John Doe | Laptop, Mouse | 1342 | John Doe | Laptop, Mouse | 1343 | John Doe | Laptop, Mouse | 1344 | John Doe | Laptop, Mouse | 1345 | John Doe | Laptop, Mouse | 1346 | John Doe | Laptop, Mouse | 1347 | John Doe | Laptop, Mouse | 1348 | John Doe | Laptop, Mouse | 1349 | John Doe | Laptop, Mouse | 1350 | John Doe | Laptop, Mouse | 1351 | John Doe | Laptop, Mouse | 1352 | John Doe | Laptop, Mouse | 1353 | John Doe | Laptop, Mouse | 1354 | John Doe | Laptop, Mouse | 1355 | John Doe | Laptop, Mouse | 1356 | John Doe | Laptop, Mouse | 1357 | John Doe | Laptop, Mouse | 1358 | John Doe | Laptop, Mouse | 1359 | John Doe | Laptop, Mouse | 1360 | John Doe | Laptop, Mouse | 1361 | John Doe | Laptop, Mouse | 1362 | John Doe | Laptop, Mouse | 1363 | John Doe | Laptop, Mouse | 1364 | John Doe | Laptop, Mouse | 1365 | John Doe | Laptop, Mouse | 1366 | John Doe | Laptop, Mouse | 1367 | John Doe | Laptop, Mouse | 1368 | John Doe | Laptop, Mouse | 1369 | John Doe | Laptop, Mouse | 1370 | John Doe | Laptop, Mouse | 1371 | John Doe | Laptop, Mouse | 1372 | John Doe | Laptop, Mouse | 1373 | John Doe | Laptop, Mouse | 1374 | John Doe | Laptop, Mouse | 1375 | John Doe | Laptop, Mouse | 1376 | John Doe | Laptop, Mouse | 1377 | John Doe | Laptop, Mouse | 1378 | John Doe | Laptop, Mouse | 1379 | John Doe | Laptop, Mouse | 1380 | John Doe | Laptop, Mouse | 1381 | John Doe | Laptop, Mouse | 1382 | John Doe | Laptop, Mouse | 1383 | John Doe | Laptop, Mouse | 1384 | John Doe | Laptop, Mouse | 1385 | John Doe | Laptop, Mouse | 1386 | John Doe | Laptop, Mouse | 1387 | John Doe | Laptop, Mouse | 1388 | John Doe | Laptop, Mouse | 1389 | John Doe | Laptop, Mouse | 1390 | John Doe | Laptop, Mouse | 1391 | John Doe | Laptop, Mouse | 1392 | John Doe | Laptop, Mouse | 1393 | John Doe | Laptop, Mouse | 1394 | John Doe | Laptop, Mouse | 1395 | John Doe | Laptop, Mouse | 1396 | John Doe | Laptop, Mouse | 1397 | John Doe | Laptop, Mouse | 1398 | John Doe | Laptop, Mouse | 1399 | John Doe | Laptop, Mouse | 1400 | John Doe | Laptop, Mouse | 1401 | John Doe | Laptop, Mouse | 1402 | John Doe | Laptop, Mouse | 1403 | John Doe | Laptop, Mouse | 1404 | John Doe | Laptop, Mouse | 1405 | John Doe | Laptop, Mouse | 1406 | John Doe | Laptop, Mouse | 1407 | John Doe | Laptop, Mouse | 1408 | John Doe | Laptop, Mouse | 1409 | John Doe | Laptop, Mouse | 1410 | John Doe | Laptop, Mouse | 1411 | John Doe | Laptop, Mouse | 1412 | John Doe | Laptop, Mouse | 1413 | John Doe | Laptop, Mouse | 1414 | John Doe | Laptop, Mouse | 1415 | John Doe | Laptop, Mouse | 1416 | John Doe | Laptop, Mouse | 1417 | John Doe | Laptop, Mouse | 1418 | John Doe | Laptop, Mouse | 1419 | John Doe | Laptop, Mouse | 1420 | John Doe | Laptop, Mouse | 1421 | John Doe | Laptop, Mouse | 1422 | John Doe | Laptop, Mouse | 1423 | John Doe | Laptop, Mouse | 1424 | John Doe | Laptop, Mouse | 1425 | John Doe | Laptop, Mouse | 1426 | John Doe | Laptop, Mouse | 1427 | John Doe | Laptop, Mouse | 1428 | John Doe | Laptop, Mouse | 1429 | John Doe | Laptop, Mouse | 1430 | John Doe | Laptop, Mouse | 1431 | John Doe | Laptop, Mouse | 1432 | John Doe | Laptop, Mouse | 1433 | John Doe | Laptop, Mouse | 1434 | John Doe | Laptop, Mouse | 1435 | John Doe | Laptop, Mouse | 1436 | John Doe | Laptop, Mouse | 1437 | John Doe | Laptop, Mouse | 1438 | John Doe | Laptop, Mouse | 1439 | John Doe | Laptop, Mouse | 1440 | John Doe | Laptop, Mouse | 1441 | John Doe | Laptop, Mouse | 1442 | John Doe | Laptop, Mouse | 1443 | John Doe | Laptop, Mouse | 1444 | John Doe | Laptop, Mouse | 1445 | John Doe | Laptop, Mouse | 1446 | John Doe | Laptop, Mouse | 1447 | John Doe | Laptop, Mouse | 1448 | John Doe | Laptop, Mouse | 1449 | John Doe | Laptop, Mouse | 1450 | John Doe | Laptop, Mouse | 1451 | John Doe | Laptop, Mouse | 1452 | John Doe | Laptop, Mouse | 1453 | John Doe | Laptop, Mouse | 1454 | John Doe | Laptop, Mouse | 1455 | John Doe | Laptop, Mouse | 1456 | John Doe | Laptop, Mouse | 1457 | John Doe | Laptop, Mouse | 1458 | John Doe | Laptop, Mouse | 1459 | John Doe | Laptop, Mouse | 1460 | John Doe | Laptop, Mouse | 1461 | John Doe | Laptop, Mouse | 1462 | John Doe | Laptop, Mouse | 1463 | John Doe | Laptop, Mouse | 1464 | John Doe | Laptop, Mouse | 1465 | John Doe | Laptop, Mouse | 1466 | John Doe | Laptop, Mouse | 1467 | John Doe | Laptop, Mouse | 1468 | John Doe | Laptop, Mouse | 1469 | John Doe | Laptop, Mouse | 1470 | John Doe | Laptop, Mouse | 1471 | John Doe | Laptop, Mouse | 1472 | John Doe | Laptop, Mouse | 1473 | John Doe | Laptop, Mouse | 1474 | John Doe | Laptop, Mouse | 1475 | John Doe | Laptop, Mouse | 1476 | John Doe | Laptop, Mouse | 1477 | John Doe | Laptop, Mouse | 1478 | John Doe | Laptop, Mouse | 1479 | John Doe | Laptop, Mouse | 1480 | John Doe | Laptop, Mouse | 1481 | John Doe | Laptop, Mouse | 1482 | John Doe | Laptop, Mouse | 1483 | John Doe | Laptop, Mouse | 1484 | John Doe | Laptop, Mouse | 1485 | John Doe | Laptop, Mouse | 1486 | John Doe | Laptop, Mouse | 1487 | John Doe | Laptop, Mouse | 1488 | John Doe | Laptop, Mouse | 1489 | John Doe | Laptop, Mouse | 1490 | John Doe | Laptop, Mouse | 1491 | John Doe | Laptop, Mouse | 1492 | John Doe | Laptop, Mouse | 1493 | John Doe | Laptop, Mouse | 1494 | John Doe | Laptop, Mouse | 1495 | John Doe | Laptop, Mouse | 1496 | John Doe | Laptop, Mouse | 1497 | John Doe | Laptop, Mouse | 1498 | John Doe | Laptop, Mouse | 1499 | John Doe | Laptop, Mouse | 1500 | John Doe | Laptop, Mouse | 1501 | John Doe | Laptop, Mouse | 1502 | John Doe | Laptop, Mouse | 1503 | John Doe | Laptop, Mouse | 1504 | John Doe | Laptop, Mouse | 1505 | John Doe | Laptop, Mouse | 1506 | John Doe | Laptop, Mouse | 1507 | John Doe | Laptop, Mouse | 1508 | John Doe | Laptop, Mouse | 1509 | John Doe | Laptop, Mouse | 1510 | John Doe | Laptop, Mouse | 1511 | John Doe | Laptop, Mouse | 1512 | John Doe | Laptop, Mouse | 1513 | John Doe | Laptop, Mouse | 1514 | John Doe | Laptop, Mouse | 1515 | John Doe | Laptop, Mouse | 1516 | John Doe | Laptop, Mouse | 1517 | John Doe | Laptop, Mouse | 1518 | John Doe | Laptop, Mouse | 1519 | John Doe | Laptop, Mouse | 1520 | John Doe | Laptop, Mouse | 1521 | John Doe | Laptop, Mouse | 1522 | John Doe | Laptop, Mouse | 1523 | John Doe | Laptop, Mouse | 1524 | John Doe | Laptop, Mouse | 1525 | John Doe | Laptop, Mouse | 1526 | John Doe | Laptop, Mouse | 1527 | John Doe | Laptop, Mouse | 1528 | John Doe | Laptop, Mouse | 1529 | John Doe | Laptop, Mouse | 1530 | John Doe | Laptop, Mouse | 1531 | John Doe | Laptop, Mouse | 1532 | John Doe | Laptop, Mouse | 1533 | John Doe | Laptop, Mouse | 1534 | John Doe | Laptop, Mouse | 1535 | John Doe | Laptop, Mouse | 1536 | John Doe | Laptop, Mouse | 1537 | John Doe | Laptop, Mouse | 1538 | John Doe | Laptop, Mouse | 1539 | John Doe | Laptop, Mouse | 1540 | John Doe | Laptop, Mouse | 1541 | John Doe | Laptop, Mouse | 1542 | John Doe | Laptop, Mouse | 1543 | John Doe | Laptop, Mouse | 1544 | John Doe | Laptop, Mouse | 1545 | John Doe | Laptop, Mouse | 1546 | John Doe | Laptop, Mouse | 1547 | John Doe | Laptop, Mouse | 1548 | John Doe | Laptop, Mouse | 1549 | John Doe | Laptop, Mouse | 1550 | John Doe | Laptop, Mouse | 1551 | John Doe | Laptop, Mouse | 1552 | John Doe | Laptop, Mouse | 1553 | John Doe | Laptop, Mouse | 1554 | John Doe | Laptop, Mouse | 1555 | John Doe | Laptop, Mouse | 1556 | John Doe | Laptop, Mouse | 1557 | John Doe | Laptop, Mouse | 1558 | John Doe | Laptop, Mouse | 1559 | John Doe | Laptop, Mouse | 1560 | John Doe | Laptop, Mouse | 1561 | John Doe | Laptop, Mouse | 1562 | John Doe | Laptop, Mouse | 1563 | John Doe | Laptop, Mouse | 1564 | John Doe | Laptop, Mouse | 1565 | John Doe | Laptop, Mouse | 1566 | John Doe | Laptop, Mouse | 1567 | John Doe | Laptop, Mouse | 1568 | John Doe | Laptop, Mouse | 1569 | John Doe | Laptop, Mouse | 1570 | John Doe | Laptop, Mouse | 1571 | John Doe | Laptop, Mouse | 1572 | John Doe | Laptop, Mouse | 1573 | John Doe | Laptop, Mouse | 1574 | John Doe | Laptop, Mouse | 1575 | John Doe | Laptop, Mouse | 1576 | John Doe | Laptop, Mouse | 1577 | John Doe | Laptop, Mouse | 1578 | John Doe | Laptop, Mouse | 1579 | John Doe | Laptop, Mouse | 1580 | John Doe | Laptop, Mouse | 1581 | John Doe | Laptop, Mouse | 1582 | John Doe | Laptop, Mouse | 1583 | John Doe | Laptop, Mouse | 1584 | John Doe | Laptop, Mouse | 1585 | John Doe | Laptop, Mouse | 1586 | John Doe | Laptop, Mouse | 1587 | John Doe | Laptop, Mouse | 1588 | John Doe | Laptop, Mouse | 1589 | John Doe | Laptop, Mouse | 1590 | John Doe | Laptop, Mouse | 1591 | John Doe | Laptop, Mouse | 1592 | John Doe | Laptop, Mouse | 1593 | John Doe | Laptop, Mouse | 1594 | John Doe | Laptop, Mouse | 1595 | John Doe | Laptop, Mouse | 1596 | John Doe | Laptop, Mouse | 1597 | John Doe | Laptop, Mouse | 1598 | John Doe | Laptop, Mouse | 1599 | John Doe | Laptop, Mouse | 1600 | John Doe | Laptop, Mouse | 1601 | John Doe | Laptop, Mouse | 1602 | John Doe | Laptop, Mouse | 1603 | John Doe | Laptop, Mouse | 1604 | John Doe | Laptop, Mouse | 1605 | John Doe | Laptop, Mouse | 1606 | John Doe | Laptop, Mouse | 1607 | John Doe | Laptop, Mouse | 1608 | John Doe | Laptop, Mouse | 1609 | John Doe | Laptop, Mouse | 1610 | John Doe | Laptop, Mouse | 1611 | John Doe | Laptop, Mouse | 1612 | John Doe | Laptop, Mouse | 1613 | John Doe | Laptop, Mouse | 1614 | John Doe | Laptop, Mouse | 1615 | John Doe | Laptop, Mouse | 1616 | John Doe | Laptop, Mouse | 1617 | John Doe | Laptop, Mouse | 1618 | John Doe | Laptop, Mouse | 1619 | John Doe | Laptop, Mouse | 1620 | John Doe | Laptop, Mouse | 1621 | John Doe | Laptop, Mouse | 1622 | John Doe | Laptop, Mouse | 1623 | John Doe | Laptop, Mouse | 1624 | John Doe | Laptop, Mouse | 1625 | John Doe | Laptop, Mouse | 1626 | John Doe | Laptop, Mouse | 1627 | John Doe | Laptop, Mouse | 1628 | John Doe | Laptop, Mouse | 1629 | John Doe | Laptop, Mouse | 1630 | John Doe | Laptop, Mouse | 1631 | John Doe | Laptop, Mouse | 1632 | John Doe | Laptop, Mouse | 1633 | John Doe | Laptop, Mouse | 1634 | John Doe | Laptop, Mouse | 1635 | John Doe | Laptop, Mouse | 1636 | John Doe | Laptop, Mouse | 1637 | John Doe | Laptop, Mouse | 1638 | John Doe | Laptop, Mouse | 1639 | John Doe | Laptop, Mouse | 1640 | John Doe | Laptop, Mouse | 1641 | John Doe | Laptop, Mouse | 1642 | John Doe | Laptop, Mouse | 1643 | John Doe | Laptop, Mouse | 1644 | John Doe | Laptop, Mouse | 1645 | John Doe | Laptop, Mouse | 1646 | John Doe | Laptop, Mouse | 1647 | John Doe | Laptop, Mouse | 1648 | John Doe | Laptop, Mouse | 1649 | John Doe | Laptop, Mouse | 1650 | John Doe | Laptop, Mouse | 1651 | John Doe | Laptop, Mouse | 1652 | John Doe | Laptop, Mouse | 1653 | John Doe | Laptop, Mouse | 1654 | John Doe | Laptop, Mouse | 1655 | John Doe | Laptop, Mouse | 1656 | John Doe | Laptop, Mouse | 1657 | John Doe | Laptop, Mouse | 1658 | John Doe | Laptop, Mouse | 1659 | John Doe | Laptop, Mouse | 1660 | John Doe | Laptop, Mouse | 1661 | John Doe | Laptop, Mouse | 1662 | John Doe | Laptop, Mouse | 1663 | John Doe | Laptop, Mouse | 1664 | John Doe | Laptop, Mouse | 1665 | John Doe | Laptop, Mouse | 1666 | John Doe | Laptop, Mouse | 1667 | John Doe | Laptop, Mouse | 1668 | John Doe | Laptop, Mouse | 1669 | John Doe | Laptop, Mouse | 1670 | John Doe | Laptop, Mouse | 1671 | John Doe | Laptop, Mouse | 1672 | John Doe | Laptop, Mouse | 1673 | John Doe | Laptop, Mouse | 1674 | John Doe | Laptop, Mouse | 1675 | John Doe | Laptop, Mouse | 1676 | John Doe | Laptop, Mouse | 1677 | John Doe | Laptop, Mouse | 1678 | John Doe | Laptop, Mouse | 1679 | John Doe | Laptop, Mouse | 1680 | John Doe | Laptop, Mouse | 1681 | John Doe | Laptop, Mouse | 1682 | John Doe | Laptop, Mouse | 1683 | John Doe | Laptop, Mouse | 1684 | John Doe | Laptop, Mouse | 1685 | John Doe | Laptop, Mouse | 1686 | John Doe | Laptop, Mouse | 1687 | John Doe | Laptop, Mouse | 1688 | John Doe | Laptop, Mouse | 1689 | John Doe | Laptop, Mouse | 1690 | John Doe | Laptop, Mouse | 1691 | John Doe | Laptop, Mouse | 1692 | John Doe | Laptop, Mouse | 1693 | John Doe | Laptop, Mouse | 1694 | John Doe | Laptop, Mouse | 1695 | John Doe | Laptop, Mouse | 1696 | John Doe | Laptop, Mouse | 1697 | John Doe | Laptop, Mouse | 1698 | John Doe | Laptop, Mouse | 1699 | John Doe | Laptop, Mouse | 1700 | John Doe | Laptop, Mouse | 1701 | John Doe | Laptop, Mouse | 1702 | John Doe | Laptop, Mouse | 1703 | John Doe | Laptop, Mouse | 1704 | John Doe | Laptop, Mouse | 1705 | John Doe | Laptop, Mouse | 1706 | John Doe | Laptop, Mouse | 1707 | John Doe | Laptop, Mouse | 1708 | John Doe | Laptop, Mouse | 1709 | John Doe | Laptop, Mouse | 1710 | John Doe | Laptop, Mouse | 1711 | John Doe | Laptop, Mouse | 1712 | John Doe | Laptop, Mouse | 1713 | John Doe | Laptop, Mouse | 1714 | John Doe | Laptop, Mouse | 1715 | John Doe | Laptop, Mouse | 1716 | John Doe | Laptop, Mouse | 1717 | John Doe | Laptop, Mouse | 1718 | John Doe | Laptop, Mouse | 1719 | John Doe | Laptop, Mouse | 1720 | John Doe | Laptop, Mouse | 1721 | John Doe | Laptop, Mouse | 1722 | John Doe | Laptop, Mouse | 1723 | John Doe | Laptop, Mouse | 1724 | John Doe | Laptop, Mouse | 1725 | John Doe | Laptop, Mouse | 1726 | John Doe | Laptop, Mouse | 1727 | John Doe | Laptop, Mouse | 1728 | John Doe | Laptop, Mouse | 1729 | John Doe | Laptop, Mouse | 1730 | John Doe | Laptop, Mouse | 1731 | John Doe | Laptop, Mouse | 1732 | John Doe | Laptop, Mouse | 1733 | John Doe | Laptop, Mouse | 1734 | John Doe | Laptop, Mouse | 1735 | John Doe | Laptop, Mouse | 1736 | John Doe | Laptop, Mouse | 1737 | John Doe | Laptop, Mouse | 1738 | John Doe | Laptop, Mouse | 1739 | John Doe | Laptop, Mouse | 1740 | John Doe | Laptop, Mouse | 1741 | John Doe | Laptop, Mouse | 1742 | John Doe | Laptop, Mouse | 1743 | John Doe | Laptop, Mouse | 1744 | John Doe | Laptop, Mouse | 1745 | John Doe | Laptop, Mouse | 1746 | John Doe | Laptop, Mouse | 1747 | John Doe | Laptop, Mouse | 1748 | John Doe | Laptop, Mouse | 1749 | John Doe | Laptop, Mouse | 1750 | John Doe | Laptop, Mouse | 1751 | John Doe | Laptop, Mouse | 1752 | John Doe | Laptop, Mouse | 1753 | John Doe | Laptop, Mouse | 1754 | John Doe | Laptop, Mouse | 1755 | John Doe | Laptop, Mouse | 1756 | John Doe | Laptop, Mouse | 1757 | John Doe | Laptop, Mouse | 1758 | John Doe | Laptop, Mouse | 1759 | John Doe | Laptop, Mouse | 1760 | John Doe | Laptop, Mouse | 1761 | John Doe | Laptop, Mouse | 1762 | John Doe | Laptop, Mouse | 1763 | John Doe | Laptop, Mouse | 1764 | John Doe | Laptop, Mouse | 1765 | John Doe | Laptop, Mouse | 1766 | John Doe | Laptop, Mouse | 1767 | John Doe | Laptop, Mouse | 1768 | John Doe | Laptop, Mouse | 1769 | John Doe | Laptop, Mouse | 1770 | John Doe | Laptop, Mouse | 1771 | John Doe | Laptop, Mouse | 1772 | John Doe | Laptop, Mouse | 1773 | John Doe | Laptop, Mouse | 1774 | John Doe | Laptop, Mouse | 1775 | John Doe | Laptop, Mouse | 1776 | John Doe | Laptop, Mouse | 1777 | John Doe | Laptop, Mouse | 1778 | John Doe | Laptop, Mouse | 1779 | John Doe | Laptop, Mouse | 1780 | John Doe | Laptop, Mouse | 1781 | John Doe | Laptop, Mouse | 1782 | John Doe | Laptop, Mouse | 1783 | John Doe | Laptop, Mouse | 1784 | John Doe | Laptop, Mouse | 1785 | John Doe | Laptop, Mouse | 1786 | John Doe | Laptop, Mouse | 1787 | John Doe | Laptop, Mouse | 1788 | John Doe | Laptop, Mouse | 1789 | John Doe | Laptop, Mouse | 1790 | John Doe | Laptop, Mouse | 1791 | John Doe | Laptop, Mouse | 1792 | John Doe | Laptop, Mouse | 1793 | John Doe | Laptop, Mouse | 1794 | John Doe | Laptop, Mouse | 1795 | John Doe | Laptop, Mouse | 1796 | John Doe | Laptop, Mouse | 1797 | John Doe | Laptop, Mouse | 1798 | John Doe | Laptop, Mouse | 1799 | John Doe | Laptop, Mouse | 1800 | John Doe | Laptop, Mouse | 1801 | John Doe | Laptop, Mouse | 1802 | John Doe | Laptop, Mouse | 1803 | John Doe | Laptop, Mouse | 1804 | John Doe | Laptop, Mouse | 1805 | John Doe | Laptop, Mouse | 1806 | John Doe | Laptop, Mouse | 1807 | John Doe | Laptop, Mouse | 1808 | John Doe | Laptop, Mouse | 1809 | John Doe | Laptop, Mouse | 1810 | John Doe | Laptop, Mouse | 1811 | John Doe | Laptop, Mouse | 1812 | John Doe | Laptop, Mouse | 1813 | John Doe | Laptop, Mouse | 1814 | John Doe | Laptop, Mouse | 1815 | John Doe | Laptop, Mouse | 1816 | John Doe | Laptop, Mouse | 1817 | John Doe | Laptop, Mouse | 1818 | John Doe | Laptop, Mouse | 1819 | John Doe | Laptop, Mouse | 1820 | John Doe | Laptop, Mouse | 1821 | John Doe | Laptop, Mouse | 1822 | John Doe | Laptop, Mouse | 1823 | John Doe | Laptop, Mouse | 1824 | John Doe | Laptop, Mouse | 1825 | John Doe | Laptop, Mouse | 1826 | John Doe | Laptop, Mouse | 1827 | John Doe | Laptop, Mouse | 1828 | John Doe | Laptop, Mouse | 1829 | John Doe | Laptop, Mouse | 1830 |

