**\*Experimental results of DroidMutator, DroidMutator\* and MDroid+. The experimental data is 50 apps randomly downloaded from the open source application website F-Droid.**

1. DroidMutator experimental result data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **#App** | **Mutation Time(sec)** | **#Gen. Mutants** | **#Stillborn Mutants** | **#Trivial Mutants** | **#Java Files** |
| abcore | 10.09 | 577 | 2 | 6 | 19 |
| ActivityLauncher | 6.4 | 138 | 0 | 4 | 18 |
| archwiki-viewer | 6.02 | 169 | 0 | 10 | 18 |
| AsciiCam | 44.74 | 2033 | 0 | 16 | 22 |
| AudioMeter | 4.66 | 233 | 0 | 5 | 8 |
| blokish | 33.68 | 2568 | 1 | 58 | 22 |
| BoogDroid | 14.84 | 673 | 0 | 18 | 38 |
| CamTimer | 13.59 | 792 | 0 | 17 | 13 |
| Color-picker-library | 2.26 | 35 | 0 | 9 | 12 |
| ComputationalDemonology | 31.67 | 2422 | 2 | 9 | 25 |
| debatekeeper | 63.34 | 1929 | 12 | 22 | 38 |
| Duorem | 13.73 | 771 | 1 | 14 | 20 |
| FaceSlim | 36.35 | 1091 | 1 | 1 | 29 |
| filmchecker | 7.57 | 199 | 1 | 4 | 24 |
| flashlight | 4.2 | 119 | 0 | 0 | 4 |
| Flym | 8.41 | 545 | 0 | 22 | 54 |
| freeotp-android | 14.93 | 668 | 0 | 1 | 20 |
| good-weather | 16.63 | 658 | 0 | 44 | 41 |
| Kaleidoscope | 26.1 | 1592 | 1 | 16 | 18 |
| Memento | 16.5 | 793 | 0 | 34 | 35 |
| meteroid | 23.41 | 394 | 2 | 5 | 23 |
| mintube | 40.95 | 947 | 0 | 6 | 19 |
| mtmods4android | 23.81 | 958 | 0 | 14 | 26 |
| notepad | 66.05 | 1628 | 1 | 0 | 37 |
| nwsweatheralertswidget | 8.64 | 293 | 0 | 8 | 17 |
| OpenAPK | 10.8 | 308 | 0 | 7 | 24 |
| OpenBikeSharing | 16.97 | 644 | 0 | 13 | 23 |
| OpenNoteScanner | 43.87 | 1732 | 1 | 118 | 24 |
| osmtracker-android | 26.07 | 1620 | 6 | 4 | 57 |
| ParkenDD | 11.48 | 611 | 0 | 10 | 19 |
| Primary | 32.87 | 2635 | 2 | 23 | 37 |
| ReGex | 12.49 | 672 | 0 | 61 | 21 |
| retrobreaker | 15.93 | 1203 | 0 | 10 | 12 |
| rgb-tool | 19.14 | 1358 | 0 | 3 | 53 |
| save-for-offline | 15.48 | 573 | 0 | 9 | 13 |
| Shaarlier | 11.75 | 537 | 2 | 15 | 17 |
| sigfood | 11.76 | 598 | 5 | 16 | 19 |
| SimpleExplorer | 23.14 | 1350 | 2 | 42 | 53 |
| Snooder21 | 33.48 | 1390 | 0 | 29 | 8 |
| SpeedMeter | 6.41 | 298 | 0 | 9 | 4 |
| talalarmo | 10.78 | 735 | 0 | 1 | 15 |
| timelapse-sony | 24.93 | 976 | 0 | 50 | 27 |
| transistor | 33.06 | 1249 | 1 | 38 | 31 |
| tuner | 62.01 | 2853 | 0 | 144 | 20 |
| upm-android | 41.96 | 1620 | 2 | 4 | 38 |
| Weather | 17.1 | 624 | 0 | 16 | 42 |
| World-Weather | 19.22 | 1243 | 8 | 12 | 88 |
| XkcdViewer | 11.59 | 372 | 3 | 24 | 16 |
| DemocracyDroid | 13.24 | 533 | 0 | 10 | 27 |
| OneTwo | 17.46 | 744 | 0 | 19 | 16 |
| **Average:** | 21.6312 | 974.06 | 1.12 | 20.6 | 26.08 |
| **Total:** | 1081.56 | 48703 | 56 | 1030 | 1304 |

1. DroidMutator\* (No type checking) experimental result data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **#App** | **Mutation Time(s)** | **#Gen. Mutants** | **#Stillborn Mutants** | **#Trivial Mutants** | **#Java Files** |
| abcore | 10.14 | 808 | 288 | 6 | 19 |
| ActivityLauncher | 5.35 | 170 | 40 | 4 | 18 |
| archwiki-viewer | 5.74 | 208 | 80 | 10 | 18 |
| AsciiCam | 32.67 | 2520 | 664 | 16 | 22 |
| AudioMeter | 3.56 | 195 | 8 | 5 | 8 |
| blokish | 55.31 | 2985 | 445 | 58 | 22 |
| BoogDroid | 13.35 | 1249 | 449 | 18 | 38 |
| CamTimer | 15.38 | 930 | 268 | 17 | 13 |
| Color-picker-library | 1.76 | 37 | 8 | 9 | 12 |
| ComputationalDemonology | 27.94 | 2781 | 84 | 9 | 25 |
| debatekeeper | 76.75 | 3011 | 1312 | 22 | 38 |
| Duorem | 17.19 | 1257 | 492 | 14 | 20 |
| FaceSlim | 37.26 | 1662 | 756 | 1 | 29 |
| filmchecker | 9.67 | 595 | 432 | 4 | 24 |
| flashlight | 7.49 | 314 | 52 | 0 | 4 |
| Flym | 7.02 | 500 | 254 | 22 | 54 |
| freeotp-android | 17.69 | 783 | 204 | 1 | 20 |
| good-weather | 23.72 | 1272 | 632 | 44 | 41 |
| Kaleidoscope | 24.66 | 1708 | 220 | 16 | 18 |
| Memento | 29.75 | 2371 | 792 | 34 | 35 |
| meteroid | 11.39 | 587 | 260 | 5 | 23 |
| mintube | 32.03 | 1804 | 596 | 6 | 19 |
| mtmods4android | 23.19 | 1841 | 1028 | 14 | 26 |
| notepad | 62.9 | 2450 | 1152 | 0 | 37 |
| nwsweatheralertswidget | 6.47 | 325 | 144 | 8 | 17 |
| OpenAPK | 13.47 | 520 | 240 | 7 | 24 |
| OpenBikeSharing | 18.56 | 1034 | 432 | 13 | 23 |
| OpenNoteScanner | 60.01 | 2356 | 600 | 118 | 24 |
| osmtracker-android | 45.69 | 3437 | 2072 | 4 | 57 |
| ParkenDD | 12.93 | 1010 | 455 | 10 | 19 |
| Primary | 43.84 | 3570 | 984 | 23 | 37 |
| ReGex | 14.43 | 1201 | 536 | 61 | 21 |
| retrobreaker | 19.27 | 1500 | 204 | 10 | 12 |
| rgb-tool | 23.56 | 2243 | 804 | 3 | 53 |
| save-for-offline | 17.3 | 1216 | 744 | 9 | 13 |
| Shaarlier | 11.67 | 692 | 308 | 15 | 17 |
| sigfood | 17.15 | 1436 | 669 | 16 | 19 |
| SimpleExplorer | 27.11 | 2197 | 865 | 42 | 53 |
| Snooder21 | 29.72 | 1397 | 160 | 29 | 8 |
| SpeedMeter | 11.45 | 737 | 276 | 9 | 4 |
| talalarmo | 10.92 | 853 | 92 | 1 | 15 |
| timelapse-sony | 30.16 | 2173 | 923 | 50 | 27 |
| transistor | 44.55 | 2674 | 1396 | 38 | 31 |
| tuner | 67.02 | 3680 | 316 | 144 | 20 |
| upm-android | 48.39 | 1966 | 516 | 4 | 38 |
| Weather | 26.79 | 1785 | 828 | 16 | 42 |
| World-Weather | 24.1 | 2310 | 1373 | 12 | 88 |
| XkcdViewer | 18.35 | 840 | 380 | 24 | 16 |
| DemocracyDroid | 19.53 | 1010 | 360 | 10 | 27 |
| OneTwo | 17.07 | 1013 | 104 | 19 | 16 |
| **Average:** | 24.6284 | 1504.26 | 525.94 | 20.6 | 26.08 |
| **Total:** | 1231.42 | 75213 | 26297 | 1030 | 1304 |

1. MDroid+ experimental result data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **#App** | **Mutation Time(sec)** | **#Gen. Mutants** | **#Stillborn Mutants** | **#Trivial Mutants** | **#Java Files** |
| abcore | 74 | 169 | 3 | 0 | 19 |
| ActivityLauncher | 41 | 85 | 4 | 0 | 18 |
| archwiki-viewer | 6 | 26 | 1 | 0 | 18 |
| AsciiCam | 30 | 107 | 4 | 2 | 22 |
| AudioMeter | 13 | 49 | 1 | 0 | 8 |
| blokish | 42 | 81 | 3 | 12 | 22 |
| BoogDroid | 117 | 222 | 2 | 4 | 38 |
| CamTimer | 23 | 81 | 1 | 5 | 13 |
| Color-picker-library | 3 | 34 | 3 | 0 | 12 |
| ComputationalDemonology | 37 | 51 | 4 | 0 | 25 |
| debatekeeper | 200 | 249 | 1 | 2 | 38 |
| Duorem | 32 | 177 | 2 | 0 | 20 |
| FaceSlim | 367 | 328 | 7 | 0 | 29 |
| filmchecker | 49 | 114 | 2 | 0 | 24 |
| flashlight | 21 | 41 | 1 | 0 | 4 |
| Flym | 77 | 131 | 2 | 8 | 54 |
| freeotp-android | 24 | 73 | 1 | 0 | 20 |
| good-weather | 201 | 317 | 6 | 30 | 41 |
| Kaleidoscope | 30 | 101 | 3 | 2 | 18 |
| Memento | 156 | 380 | 1 | 24 | 35 |
| meteroid | 86 | 98 | 4 | 0 | 23 |
| mintube | 64 | 160 | 5 | 0 | 19 |
| mtmods4android | 160 | 380 | 6 | 1 | 26 |
| notepad | 165 | 323 | 3 | 0 | 37 |
| nwsweatheralertswidget | 20 | 91 | 4 | 0 | 17 |
| OpenAPK | 335 | 264 | 11 | 0 | 24 |
| OpenBikeSharing | 121 | 186 | 4 | 10 | 23 |
| OpenNoteScanner | 74 | 197 | 1 | 18 | 24 |
| osmtracker-android | 800 | 396 | 2 | 2 | 57 |
| ParkenDD | 41 | 161 | 1 | 0 | 19 |
| Primary | 155 | 243 | 2 | 0 | 37 |
| ReGex | 29 | 69 | 1 | 23 | 21 |
| retrobreaker | 9 | 40 | 1 | 0 | 12 |
| rgb-tool | 145 | 217 | 2 | 0 | 53 |
| save-for-offline | 97 | 153 | 1 | 0 | 13 |
| Shaarlier | 67 | 249 | 9 | 0 | 17 |
| sigfood | 137 | 244 | 11 | 2 | 19 |
| SimpleExplorer | 255 | 348 | 1 | 11 | 53 |
| Snooder21 | 11 | 51 | 0 | 0 | 8 |
| SpeedMeter | 6 | 49 | 1 | 0 | 4 |
| talalarmo | 7 | 46 | 1 | 0 | 15 |
| timelapse-sony | 129 | 291 | 5 | 20 | 27 |
| transistor | 188 | 362 | 13 | 13 | 31 |
| tuner | 53 | 117 | 1 | 2 | 20 |
| upm-android | 24 | 135 | 0 | 0 | 38 |
| Weather | 304 | 383 | 8 | 10 | 42 |
| World-Weather | 319 | 371 | 1 | 8 | 88 |
| XkcdViewer | 6 | 65 | 2 | 1 | 16 |
| DemocracyDroid | 89 | 251 | 1 | 3 | 27 |
| OneTwo | 129 | 144 | 0 | 1 | 16 |
| **Average:** | 111.36 | 178 | 3.08 | 4.28 | 26.08 |
| **Total:** | 5568 | 8900 | 154 | 213 | 1304 |