## MySQL command:

```
SELECT psg.Id, psg.headshotKills, psg.kills, psg.headshotRatio

FROM(

SELECT psa.Id AS Id, psa.headshotKills AS headshotKills, psa.kills AS kills, psa.headshotKills / psa.kills AS headshotRatio FROM (

SELECT ps.Id AS Id, SUM(ps.headshotKills) AS headshotKills, SUM(ps.kills) AS kills FROM player_statistic ps

WHERE ps.kills >= 
GROUP BY ps.Id
) AS psa

WHERE psa.kills >= 20

ORDER BY psa.kills DESC
) AS psg

ORDER BY psg.headshotRatio DESC
LIMIT 100;
```

## **Explanation:**

For an online game developer, one of the most important things is to make players keep playing their game. To achieve this, the maintenance of players' experience is required. What damages users' experience the most could be the quality of connection, the game fluency, or the equality between players.

This days, some players start trying to win the games by using illegal programs. Therefore, I want to find the abnormal players through headshot kill ratio, which is the ratio of headshotKills and Kills from the player statistic.

Firstly, if the number of kills is too small, headshotKills might be coincident, so I only pick the data of number of kills being not less than 5.

Secondly, the players who use illegal program won't only play once, so I pick the players who kill not less than 20 people in total.

Lastly, I pick the players with top 100 headshotKills ratio, which might imply that those players may use illegal program.

## Result:

	+    Id	headshotKills	kills	headshotRatio
3a2994fb2950b				
Begebicee0135	· · · · · · · · · · · · · · · · · · ·			
bccc10b09592d7	a7ad68271a7137	23	25	0.9200
F5435398d51387				
S79949F753978c				
9b5bc23a3dd42a				
d3d6c5d4f6aFa4				
offdoarCc11647				
3ediob919c586e				
C47bd86daa3de6	3ed16b919c586e	17		0.8500
205623750baa0b				
dcc334c35506bf	265e23756baa0b	27		0.8182
770ce2791306c4   34   43   0.7907   16337808491587   18   23   0.7826   2836C795001b0   31   40   0.7750   44513e16340a63   17   22   0.7727   4b077ee58778e0   16   21   0.7510   65567525f5160   15   20   0.7550   63376bfaafb7d8   41   55   0.7455   65567525f5160   15   20   0.7500   63376bfaafb7d8   41   55   0.7453   alce743ad40a9f   26   35   0.7429   alc.3c9645a7f43   16   22   0.7273   alc.3c9645a7f43   19   27   0.7837   aedfb11a660ef   15   20   0.6818   bzf165ddf89485   15   22   0.6818   defb11a660ef   19   28   0.6786   640a9b98466c79   16   24   0.6667   125775b670ef9   18   27   0.6660   0.6530   390d8316b0eff9   13   20   0.6590   30   30   30   30   30   30   30				
16337808495F87	770c02791306c4	34		0.7907
e283dC795001bb   31	•			
40077ec58778e0   16				
C656d752b75160   15   20   0.7500   18316b7aaFb7d8   41   55   0.7455   a1e743ad460a9f   26   35   0.7422   a1e249d4507f43   16   22   0.7273   a1e743ad460a9f   26   35   0.7422   b7b8b07bfa9bfc   23   32   0.7188   724389435577f   20   28   0.7143   96277c51174149   19   27   0.7037   aedfb11a660ef   15   22   0.6818   b2f1650d459485   15   22   0.6818   b2f1650d389334   18   27   0.6667   640a9b98466c79   16   24   0.6667   f362f550f706f9   18   27   0.6667   f362f550f706f9   18   27   0.6667   f362f550f706f9   18   27   0.6667   f362f550f706f9   18   27   0.6667   125775b5f881e8   17   26   0.6538   35431f7952d525   13   20   0.6590   930d8316beff9   13   20   0.6590   930d8316beff9   13   20   0.6590   930d8316beff9   13   20   0.6590   640a044ef47f705cea   16   25   0.6400   be58e6454cb88f   14   22   0.6364   e0772fdf8fe2cc   15   24   0.6250   61b7ff65e737d   13   21   0.6190   b73e588c9cc91c   13   21   0.6190   b73e588c9cc91c   13   21   0.6190   b73e588c9cc91c   13   21   0.6190   b73e588c9co1c   13   21   0.6190   b63e6180f7c2   16   26   0.6544   23   0.6087   b64d6255b45bf3   17   28   0.6071   509562   50fe157ad7cfbf   17   29   0.5862   50fe157ad7cfbf				
ala-fradad-460a9f   26   35   0.7429     ala-Ga-64-Sar-faa   16   22   0.7273     e3f-0e-0ds2ef-546   26   36   0.7222     b7b8b07bra9bfc   23   32   0.7188     7243899435577f   20   28   0.7143     96277c51174149   19   27   0.7037     aedfb11a660ef   15   22   0.6818     b2f165ddf89485   15   22   0.6818     b2f165ddf89485   15   22   0.6818     b2f165ddf89485   15   22   0.6818     b3f165dec2cff   19   28   0.6786     640a9b98466c79   16   24   0.6667     f362f59f0706f9   18   27   0.6667     f362f59f0706f9   18   27   0.6667     125775b6f881e8   17   26   0.6538     s3431ff92d2525   13   20   0.6500     930d8316beff9   13   20   0.6500     930d8316beff9   13   20   0.6500     930d8316beff9   13   20   0.6500     58ada568ab859e   16   25   0.6400     58ada568ab859e   16   25   0.6400     58ada568ab859e   16   25   0.6400     60772fdf8fe2cc   15   24   0.6250     61b7ff6sfe237d   13   21   0.6190     b73e588c0cc91c   13   21   0.6190     b73e588c0cc91c   13   21   0.6190     b83de011801fc2   16   26   0.6154     f9d14251d99ecf   14   23   0.6087     bbdde255b45bf3   17   28   0.6071     f699c882c5dfab   20   33   0.6061     7547b44c1975e6   15   25   0.6000     5747b44c1975e6   15   25   0.6000     57457b44c1975e6   15   25   0.6000     57667s3ebc04ed37   17   29   0.5862     576f157ad7rcfbf   17   29   0.5862     576f157ad7rcfbf   17   29   0.5862     576f157ad7rcfbf   17   29   0.5862     573b7840705529   13   23   0.5552     73b784070559   13   23   0.5552     73b784070559   13   23   0.5552     73b784070559   13   23   0.5552     73b784070559   13   23   0.5500     0bc36e35b38666   10   20   0.5900     0bc46c325b38666   10   20   0.5900     0bc46c325b38666   10   21   0.4762     288664815114eab   13   28   0.4643     799653a2459609   16   27   0.5906     0bc46c93646670   15   25   0.6000     0bc46c93646670   15   25   0.6000     0bc46c93646670   15   25   0.6000     0bc46c9546756e   10   21   0.4762     28864685b73ceb   9   20   0.4506     0bc66754b7656   10   22   0.4545     0dc66766766666   10   22		15		
a1c3-c9645a7f43   16   22   0.7273   c970b8b07b7a9bfc   23   32   0.7188   7243899435577f   20   28   0.7143   96277c51174149   19   27   0.7037   aedfb11a6660ef   15   22   0.6818   b2f165df89485   15   22   0.6818   18b7e6fdec2cff   19   28   0.6786   640a9b98466c79   16   24   0.6667   152575bf891e8   17   26   0.6538   35431f792d525   13   20   0.6500   44aef47f05cca   16   25   0.6683   35431f792d525   13   20   0.6500   44aef47f05cca   16   25   0.6400   be58e6454cb8f   14   22   0.6364   ec348a610941b9   14   22   0.6364   ec348a610941b9   14   22   0.6364   ec77cf8fe2cc   15   24   0.6250   61b7ffd5ef237d   13   21   0.6190   b73e588cc91c   13   21   0.6190   b73e588cc91c   13   21   0.6190   b23de11880fc2   13   21   0.6190   b23de11880fc2   13   21   0.6190   b23de3105922   13   21   0.6190   b23de3105922   13   21   0.6190   b23de3126925   13   21   0.6190   b73e588c6c91c   13   21   0.6190   b73e588c6c91c   13   21   0.6190   b23de311880fc2   16   26   0.6554   b73e588cc91c   13   21   0.6190   b23de3128922   13   21   0.6190   b23de3128926   16   27   0.5926   50fe157ad7cfbf   17   29   0.5862   50fe157ad7cfbf   17   29   0				
e3f0e0d52cf546   20   36   0.7722	a1c3c9645a7f43			
7243899435577f   20   28   0.7143   3edfb11a6660ef   15   22   0.6818   b2f105ddf89485   15   22   0.6818   b2f105ddf89485   15   22   0.6818   b2f105ddf89485   15   22   0.6818   b2f105ddf89485   15   22   0.6818   566786   59df1590389334   18   27   0.6667   640a9b9846679   16   24   0.6667   640a9b9846679   16   24   0.6667   125775b6f081e8   17   26   0.6538   35431f92d2525   13   20   0.65500   33431f92d2525   13   20   0.65500   390d8316beff9   13   20   0.6500   40e4a6f74f905eca   16   25   0.6400   58ada568ab859e   16   25   0.6400   58ada568ab859e   16   25   0.6400   58ada568ab859e   16   25   0.6400   61b7ff65f237d   13   21   0.6190   61b7ff65f237d   13   21   0.6190   61b7ff65f237d   13   21   0.6190   6284438470972   13   21   0.6190   6284438470972   13   21   0.6190   6284438470972   13   21   0.6190   628461880ffc2   16   26   0.6154   690625545bf3   17   28   0.6071   6906825545bf3   17   28   0.6071   6906825545bf3   17   28   0.6071   6906825545bf3   17   28   0.6071   6906825545bf3   17   29   0.5862   2495dc2d59b029   16   27   0.5926   2495dc2d59b029   16   27   0.5926   2495dc2d59b029   16   27   0.5926   2495dc2d59b05   12   21   0.5714   240d15252b81014b   27   29   0.5862   436d15369eb00   31   53   0.5849   a651c19d213b79   14   24   0.5833   15   0.5806   2495dc2d594056   12   21   0.5714   25068556   22   21   0.5714   25068556   22   21   0.5714   2506866556   2506866576   25069666765676   2506966765676   2506966766676   2506966765676   2506966765676   2506966765676   2506966766676   250696676676676   2506966766676   2506966766676   2506966766766   2506966766676   2506966766676   2506966766676   2506966766766   2506966767666   25069667	the contract of the contract o	26	36	0.7222
96277c51174149   19				
b2f165ddf89485	96277c51174149	19	27	0.7037
18b7e6fdec2cff				
640a9b98466C79	18b7e6fdec2cff	19	28	0.6786
f3a2f59f8766f9				
35431f592d5255	f362f59f0706f9			
930d8316b0eff9				
S88da568ab859e				
be58e6454cbb8f				
e0772fdf8fe2cc				
61b7ffdSef237d				
b73e588c0cc91c				
e00a2d5190392a	b73e588c0cc91c	13	21	0.6190
bedde011801Fc2				
bbdda255b45bf3	be3de011801fc2		26	0.6154
f699c842c5dfab				
2495dc2d59b029	· · · · · · · · · · · · · · · · · · ·			0.6061
S6Fe157ad7cfbf				
436d1530e9eb00   31				
a651c19d213b79				
3508e4fc29403c				
863b053FeS9995   12				
42ad11ece3454a   13   23   0.5652   73b784070b5f29   13   23   0.5652   71134acd8ad996   14   25   0.5600   638176120520c8   20   36   0.5556   010322b281014b   27   49   0.5510   0.5500   0.5550   0.5560   0.5556   0.5560   0.5556   0.5560   0.5556   0.5560   0.5550   0.5500   0.5500   0.5500   0.5500   0.5500   0.5500   0.5500   0.5500   0.5500   0.5000   0				0.5714
73b784070b5f29	9e90367d8522cd	12	21	0.5714
T1134acd8ad996				
d1032zb281014b	71134acd8ad996	14	25	0.5600
25873d36944d64				
S7087b13f55f11	25873d36944d64	11	20	0.5500
998f3a2f5d846e				
666-345df54e3a4   13   25   0.5200     079ebcb640112d   11   22   0.5000     0b8fd655a3a688   10   20   0.5000     0eda52b588c66f   10   20   0.5000     0eda52b588c66f   10   20   0.5000     6bca1a3e221b2c   11   22   0.5000     6bca1a3e221b2c   11   22   0.5000     6bca63804657c   15   30   0.5000     b4cc6c3804657c   15   30   0.5000     acf8cdf5607908   18   37   0.4865     060c413d0e2379   15   31   0.4863     e4c109ce8a4baa   12   25   0.4800     0b2608c87c746a   10   21   0.4762     e3a6e0276de889   10   21   0.4762     e3a6e0276de889   10   21   0.4762     e3a6e0276de889   10   21   0.4762     e3a6e0276de889   12   26   0.4615     o1c111b670948   10   22   0.4545     661a67b8f78f66   10   22   0.4545     661a67b8f78f66   10   22   0.4545     61a67b8f78f66   10   22   0.4545     640a6b5b873ceb   9   20   0.4504     bcfe7f21eb47cb   17   39   0.4338     405dc99e21822f   13   30   0.4338     405dc9pe21822f   4386	998f3a2f5d846e	11	21	0.5238
079ebcb640112d   11				
0bbfd055a3a088   10   20   0.5000   0eda52b588c06f   10   20   0.5000   0				
3a48934501640d   10		10	20	0.5000
6bca1a3e221b2c				
acf8cdf5607908   18   37   0.4865   060c413d9c2379   15   31   0.4839   e4c109ce8a4baa   12   25   0.4800   0b2608c87c746a   10   21   0.4762   1b7a2e34bb32af   10   21   0.4762   e3a6e0276de089   10   21   0.4762   8e6d4816114eab   13   28   0.4643   7936aa34c9b6a3   12   26   0.4615   e3b805bb54df1d   12   26   0.4615   01c111bb670948   10   22   0.4545   1e0ac46c9ac0ae   10   22   0.4545   661a67b8f78f66   10   22   0.4545   4dae6b5b8f3ceb   9   20   0.4500   5636124b176d54   11   25   0.4400   bcfe7f21eb47cb   17   39   0.4359   ad9fafacS8c95b   10   23   0.4348   405dc99e21822f   13   30   0.4333	6bca1a3e221b2c	11	22	0.5000
060c413d0e2379   15   31   0.4839     e4c109ce8a4baa   12   25   0.4800     0b2608c87c746a   10   21   0.4762     1b7a2e34bb32af   10   21   0.4762     e3a6e0276de089   10   21   0.4762     8e6d4816114eab   13   28   0.4643     7936a34c9b633   12   26   0.4615     e3b805bb54df1d   12   26   0.4615     e3b805bb54df1d   12   26   0.4615     e1b805bb54df1d   12   26   0.4545     10c111bb670948   10   22   0.4545     661a67b8778f66   10   22   0.4545     4dae6b5b873ceb   9   20   0.4500     5636124b176d54   11   25   0.4400     bcfe7f21eb47cb   17   39   0.4359     ad9fafac58c95b   10   23   0.4348     405dc99e21822f   13   30   0.4333				
0b2608c87c746a   10	060c413d0e2379	15	31	0.4839
1b7a2e34bb32af   10				
8e6d4816114eab   13	1b7a2e34bb32af	10	21	0.4762
7936aa34c9b6a3   12				
01c111bb670948   10				
1e0ac46c9ac0ae   10				
661a67b8f78f66   10				
5636124b176d54     11     25     0.4400       bcFe7f21eb47cb     17     39     0.4359       ad9fafac58c95b     10     23     0.4348       405dc99e21822f     13     30     0.4333	661a67b8f78f66	10	22	0.4545
bcfe7f21eb47cb				
405dc99e21822f   13   30   0.4333	bcfe7f21eb47cb	17	39	0.4359

Looking at the top few statistics, the first player killed 24 people with 23 headshots, and the second one killed 42 people with 40 headshots, which is pretty suspicious. Therefore, this data might show several suspicious players, which could be provided to the game developer to decide further actions.