Assessment Outputs and Conclusions
Anthony Reyes

For an in-depth look at the code, please check data_analysis.ipynb and process_game_state.py

a. Is entering via the light blue boundary a common strategy used by Team2 on T (terrorist) side?

Based on the data, no, entering via the light blue boundary is not a common strategy used by Team2 on T. Only Player5 and Player9 enter SnipersNest in round 16 in the entirety of Team2's T side.

Also intuitively from playing CS:GO, entering from SnipersNest onto BombsiteB is a very rare case for a T player. It would most likely only happen if the T player is lurking on A while the rest of the team is executing on B.

	round_num	tick	side	is_alive	x	y	z	inventory	area_name	seconds	bomb_planted	player
0	16	298025	T	True	-2139	681	300	[{'ammo_in_magazine': 10, 'ammo_in_reserve': 1...	SnipersNest	30	True	Player5
1	16	298041	T	True	-2163	668	305	[{'ammo_in_magazine': 9, 'ammo_in_reserve': 18...	SnipersNest	30	True	Player5
2	16	298057	T	True	-2186	656	299	[{'ammo_in_magazine': 9, 'ammo_in_reserve': 18...	SnipersNest	30	True	Player5
3	16	298249	T	True	-2221	911	286	[{'ammo_in_magazine': 4, 'ammo_in_reserve': 18...	SnipersNest	32	True	Player5
4	16	298265	T	True	-2226	910	305	[{'ammo_in_magazine': 4, 'ammo_in_reserve': 18...	SnipersNest	32	True	Player5
5	16	298281	T	True	-2230	911	312	[{'ammo_in_magazine': 4, 'ammo_in_reserve': 18...	SnipersNest	32	True	Player5
6	16	298297	T	True	-2230	916	306	[{'ammo_in_magazine': 4, 'ammo_in_reserve': 18...	SnipersNest	32	True	Player5
7	16	298313	T	True	-2231	919	288	[{'ammo_in_magazine': 13, 'ammo_in_reserve': 9...	SnipersNest	32	True	Player5
8	16	298057	T	True	-2183	907	296	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	30	True	Player9
9	16	298073	T	True	-2202	934	310	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	31	True	Player9
10	16	298089	T	True	-2228	955	311	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	31	True	Player9
11	16	298105	T	True	-2256	974	300	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	31	True	Player9
12	16	298121	T	True	-2273	989	308	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	31	True	Player9
13	16	298137	T	True	-2293	1006	324	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	31	True	Player9
14	16	298153	T	True	-2306	1018	334	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	31	True	Player9
15	16	298169	T	True	-2300	1018	331	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	31	True	Player9
16	16	298185	T	True	-2282	1018	321	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	31	True	Player9
17	16	298201	T	True	-2263	1007	308	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	32	True	Player9
18	16	298217	T	True	-2244	988	293	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	SnipersNest	32	True	Player9

b. What is the average timer that Team2 on T (terrorist) side enters "BombsiteB" with least 2 rifles or SMGs?

The average time that Team2 on T side enters "BombsiteB" with at least 2 rifles or SMGs is 43.2 seconds.

To find this, I did two main things:

1. Created a list of all the round_nums on Team2's T Side where the condition of at least 2 rifles or SMGs is true.
2. Created a DataFrame of all the rounds where one member of Team2 entered BombsiteB and bomb_planted = false. (I define "enter" as having one member of Team2 enter BombsiteB)

Then I used the .isin function on the DataFrame with the list of rounds to find which rounds that Team2 entered BombsiteB with the condition being true.

With that, I just used .mean() on the seconds column to get the average time the first player of Team2 entered for each round where the condition is true.

Filtering Team2's T side data by extracting weapon_classes, and checking if it passes the condition:

	round_num	tick	side	is_alive	x	y	z	inventory	area_name	seconds	bomb_planted	player	weapon_classes	match
0	16	286888	T	True	-1310	-3332	294	[{'ammo_in_magazine': 13, 'ammo_in_reserve': 2...	TSpawn	0	False	Player5	[Pistols]	False
1	16	286888	T	True	-1569	-3126	294	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	TSpawn	0	False	Player9	[Pistols]	False
2	16	286888	T	True	-1452	-3333	296	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	TSpawn	0	False	Player7	[Pistols]	False
3	16	286888	T	True	-1461	-3188	293	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	TSpawn	0	False	Player8	[Pistols]	False
4	16	286888	T	True	-1270	-3260	288	[{'ammo_in_magazine': 1, 'ammo_in_reserve': 0,...	TSpawn	0	False	Player6	[Grenade, Grenade, Pistols]	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
70	30	508876	T	True	-1499	-3126	291	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	TSpawn	0	False	Player6	[Pistols, Rifle, Grenade]	True
71	30	508876	T	True	-1539	-3066	290	[{'ammo_in_magazine': 1, 'ammo_in_reserve': 0,...	TSpawn	0	False	Player5	[Grenade, Pistols, Rifle, Grenade, Grenade]	True
72	30	508876	T	True	-1463	-3190	293	[{'ammo_in_magazine': 35, 'ammo_in_reserve': 9...	TSpawn	0	False	Player8	[Rifle, Grenade, Pistols]	True
73	30	508876	T	True	-1327	-3262	289	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	TSpawn	0	False	Player7	[Pistols, Rifle, Grenade, Grenade]	True
74	30	508876	T	True	-1459	-3262	295	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	TSpawn	0	False	Player9	[Pistols, Rifle, Grenade, Grenade]	True

Filtering Team2's T side data by checking each player's first time inside of BombsiteB and bomb_planted = False:

	round_num	tick	side	is_alive	x	y	z	inventory	area_name	seconds	bomb_planted	player
0	16	292664	T	True	-956	-265	96	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	45	False	Player8
1	16	292984	T	True	-1065	-217	99	[{'ammo_in_magazine': 17, 'ammo_in_reserve': 1...	BombsiteB	48	False	Player9
2	16	293384	T	True	-724	-3	50	[{'ammo_in_magazine': 9, 'ammo_in_reserve': 26...	BombsiteB	51	False	Player5
3	16	293496	T	True	-700	123	38	[{'ammo_in_magazine': 8, 'ammo_in_reserve': 12...	BombsiteB	52	False	Player6
4	21	358856	T	True	-897	-297	96	[{'ammo_in_magazine': 30, 'ammo_in_reserve': 9...	BombsiteB	19	False	Player8
5	21	359112	T	True	-902	-296	96	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	21	False	Player5
6	25	441436	T	True	-874	-304	96	[{'ammo_in_magazine': 30, 'ammo_in_reserve': 9...	BombsiteB	30	False	Player5
7	26	459804	T	True	-740	-122	58	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	103	False	Player5
8	28	482620	T	True	-717	-3	47	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	28	False	Player6
9	28	482748	T	True	-721	-15	49	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	29	False	Player8
10	28	483148	T	True	-671	76	23	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	32	False	Player5
11	28	483324	T	True	-714	-16	45	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	34	False	Player7
12	28	484028	T	True	-1089	-169	99	[{'ammo_in_magazine': 24, 'ammo_in_reserve': 9...	BombsiteB	39	False	Player9
13	30	513452	T	True	-1001	-248	98	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	36	False	Player8
14	30	513852	T	True	-723	-14	49	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	39	False	Player5
15	30	514124	T	True	-733	304	54	[{'ammo_in_magazine': 1, 'ammo_in_reserve': 0,...	BombsiteB	41	False	Player7

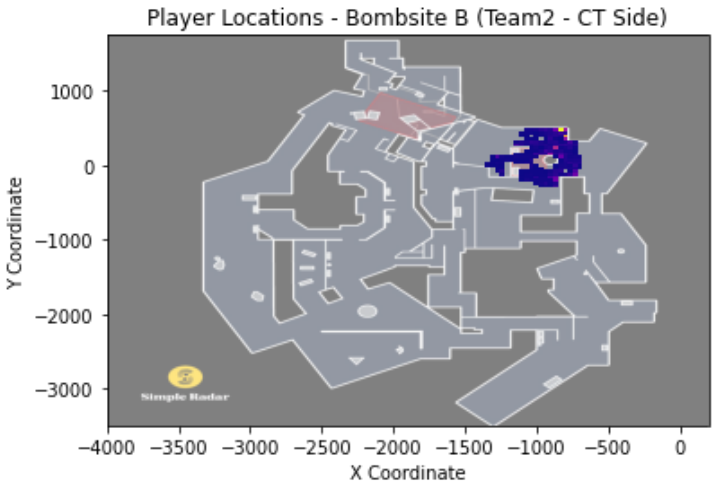
Finding which rows coincide with the list of round_num that pass the condition:

	round_num	tick	side	is_alive	x	y	z	inventory	area_name	seconds	bomb_planted	player
0	21	358856	T	True	-897	-297	96	[{'ammo_in_magazine': 30, 'ammo_in_reserve': 9...	BombsiteB	19	False	Player8
2	25	441436	T	True	-874	-304	96	[{'ammo_in_magazine': 30, 'ammo_in_reserve': 9...	BombsiteB	30	False	Player5
3	26	459804	T	True	-740	-122	58	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	103	False	Player5
4	28	482620	T	True	-717	-3	47	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	28	False	Player6
9	30	513452	T	True	-1001	-248	98	[{'ammo_in_magazine': 20, 'ammo_in_reserve': 1...	BombsiteB	36	False	Player8

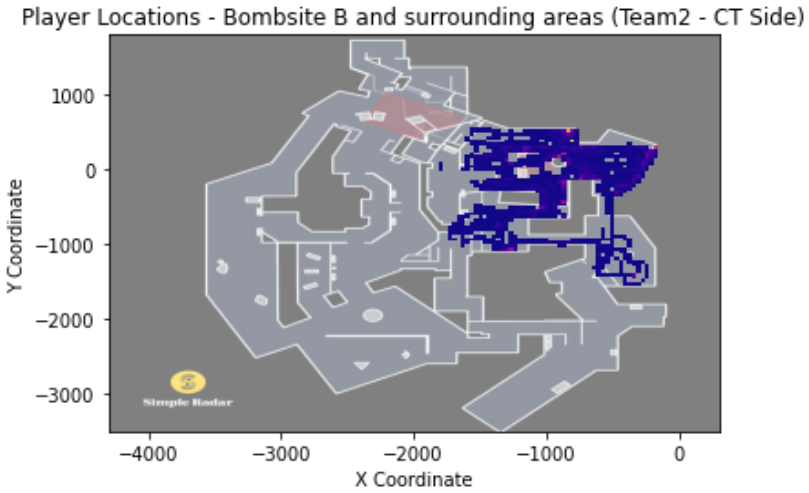
c. Now that we've gathered data on Team2 T side, let's examine their CT (counter-terrorist) Side. Using the same data set, tell our coaching staff where you suspect them to be waiting inside "BombsiteB"

i. Hint: Try a heatmap

I used matplotlib and seaborn to create and plot the heatmap onto the map provided:



More locations that may be useful can also be found using the filter_by_area_name function:



(No Coding) Most of the time, our stakeholders (in this case, the CS:GO coaching staff) aren't tech-savvy enough to run code themselves. Propose a solution to your product manager that:

a. could allow our coaching staff to request or acquire the output themselves

b. takes less than 1 weeks worth of work to implement

The solution I would propose would be a dashboard that allows the coaching staff to analyze the data without writing any code. There could be an option to upload a parquet file and the dashboard would be able to recognize what map it is and what areas of the map there are so that the coaches can use the "filter_by_area_name" function. There could also be an interactive image of the map where the coaches can plot points, similar to the light blue boundary question in the prompt. Other analysis options, such as finding what weapons players have at certain times or finding common positions, could all be established in the interface.