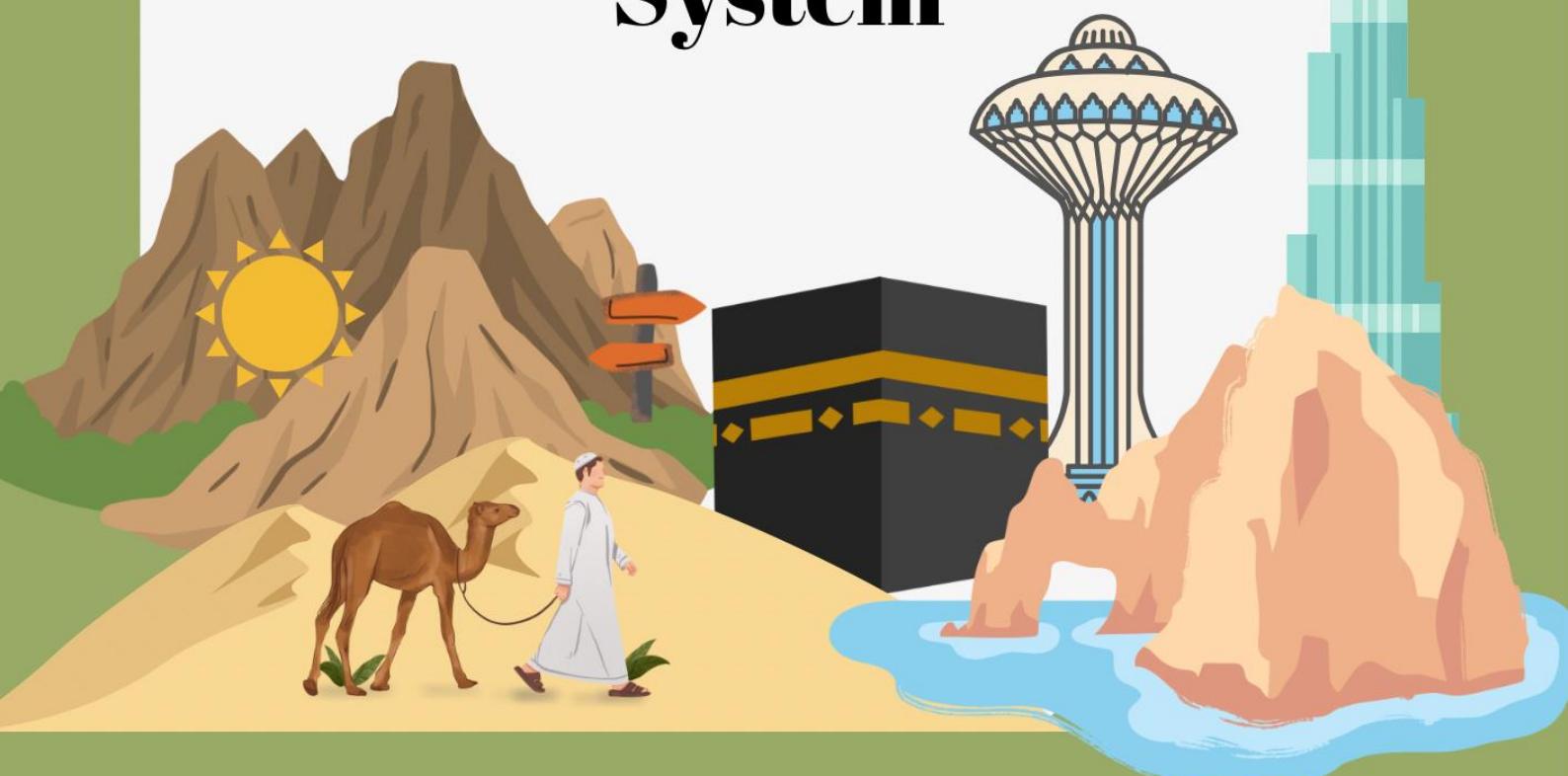


Saudi Arabia and Gulf Countries Travel Planner System



3. Methodology

3.1 Data

An expert system gathers and stores knowledge in its knowledge base to address issues related to a particular domain. Knowledge acquisition involves the process of gathering information from diverse sources to obtain the necessary knowledge. Our knowledge was collected from reliable websites that focus on the tourism of the suggested countries in our system. We use Visit Saudi [6] website which is powered by the Saudi Tourism Authority, and Trip Advisor [7] which is a popular travel website that has a collection of user-generated reviews and ratings that have been shared by travelers who share their experiences, feedback, and recommendations from around the world.

Rahaal expert system has 43 rules, including the start rule, menu rule, 13 rules from **Table 1** that ask the user about his/her trip preferences, 13 rules from **Table 2** to suggest the destination based on the preference of the user, and 13 rules from **Table 3** to suggest a planned trip for each destination. Also, there's an exit rule and a thanks message rule. The tables are shown below:

3.1.1 Table 1: Trip Preferences

Table 1: Trip preferences

ID	Preferences
1	Trip to KSA.
2	Trip to the other Gulf Countries.
3	Family trip.
4	Nature.
5	Restaurants and entertainment places.
6	Entertainment places.
7	Adventure trip.
8	Shopping.
9	Relaxing places.
10	Historical places.
11	Museums.

3.1.2 Table 2: Destination Based on Preferences

Table 2: Destination based on preferences

ID	Destination	Preferences
D1	Umluj	1,3,4,9 or 1,4,9
D2	Abha	1,3,4,7 or 1,4,7
D3	Al Ula	1,3,4,10 or 1,4,10
D4	Al Taif	1,3,4 or 1,4
D5	Riyadh	1,3,5,8 or 1,5,8
D6	Al Khobar	1,3,5 or 1,5
D7	Jeddah	1,3,7 or 1,7
D8	Makkah	1,3 or 1
D9	Qatar	2
D10	Bahrain	2,11
D11	Kuwait	2, 6
D12	Dubai	2, 3
D13	Oman	2, 3, 4

3.1.3 Table 3: Trip Suggested Plans

Table 3: Trip suggested plans

ID	Plan	Destination
P1	Starting with the Waves Hotel. Then, the silk sand beach or Duqm Island. And if you are a yoga lover you can take yoga classes during the sunset while you are on the beach of Umluj.	D1
P2	Starting from the Dabbab walkway, to the telefrcic. After that, hiking the Souda Mountain. Also, visit Al Masgi Park. Then, explore the Bees Tower Honey Refinery.	D2
P3	Starting from Al Ula Old Town to the amazing Elephant Rock. After that, the Maraya Concert Hall, and then explore Madain Saleh.	D3
P4	Starting from La Fontaine Alshafa resort, then going to the Taif City Walk. After that, exploring the strawberry farm in Alhada.	D4
P5	Shopping and exploring restaurants at the Boulevard City and Riyadh Park mall. After that, going to Murabba Historical Palace. Lastly, have an unforgettable adventure with the camel-back safari at nofa.	D5

P6	Starting from exploring restaurants in Ajdan Walk, then watching a movie in the cinema. After that, going to the Escape Room, which is a real-life experience, and then to Gravity trampolines.	D6
P7	Starting from Historic Jeddah, and then going on a Scuba Diving Tour. After that, going to Arabian horse-riding at the red sea, and camping in the Al-Balaj camp.	D7
P8	Make umrah and explore nearby sites. Then, to Al Madinah Al Munawwarah to visit the Al Masjid Al Nabawi.	D8
P9	Visit Souq waqif to see the traditional Qatari building and buy local products. Then go to Katara cultural village. Also, you can reside in The Pearl Island that has luxurious outlets, restaurants, cafes, and entertainment venues. Moreover, you can visit Lusail Corniche, Banana Island, Mushaireb, and old Doha port.	D9
P10	Visit the Bahrain National Museum to explore the rich history and cultural of Bahrain. Also, the Busaad Art Gallery to enjoy the contemporary artworks. Take a glimpse of the Bahrain's military history at the Bahrain Military Museum. Lastly, Enjoy the traditional food in Freej Bin Rashdan Bahraini Cuisine.	D10
P11	Visit the paintball Kuwait to play a high intensity game that give you the chance to shoot your friends without causing harm. Then, play "Escape the Room" where you and your team must work together to solve puzzles in Dream Factory. Also, enjoy the water slides in Aqua Park. Finally, attend a play in one of the largest theatres which is the JACC national theatre.	D11
P12	Start with Discovering Dubai Mall, then dive into underwater adventure at Dubai Aquarium & Underwater Zoo. After that watch Dubai Fountain where water, music, and light come together creating a spectacular show. To further enrich your Dubai experience, make your way to Global Village to explore cultures, cuisines from around the world.	D12
P13	Darbar Waterfall and wadi Shab are great places to enjoy the beauty of nature. Explore the breathtaking canyons and valleys in the East Salalah Mountain and stay in Sheraton Oman Hotel or if you want an amazing beach view, go to the InterContinental Muscat Hotel.	D13

3.1.4 Flow Diagram

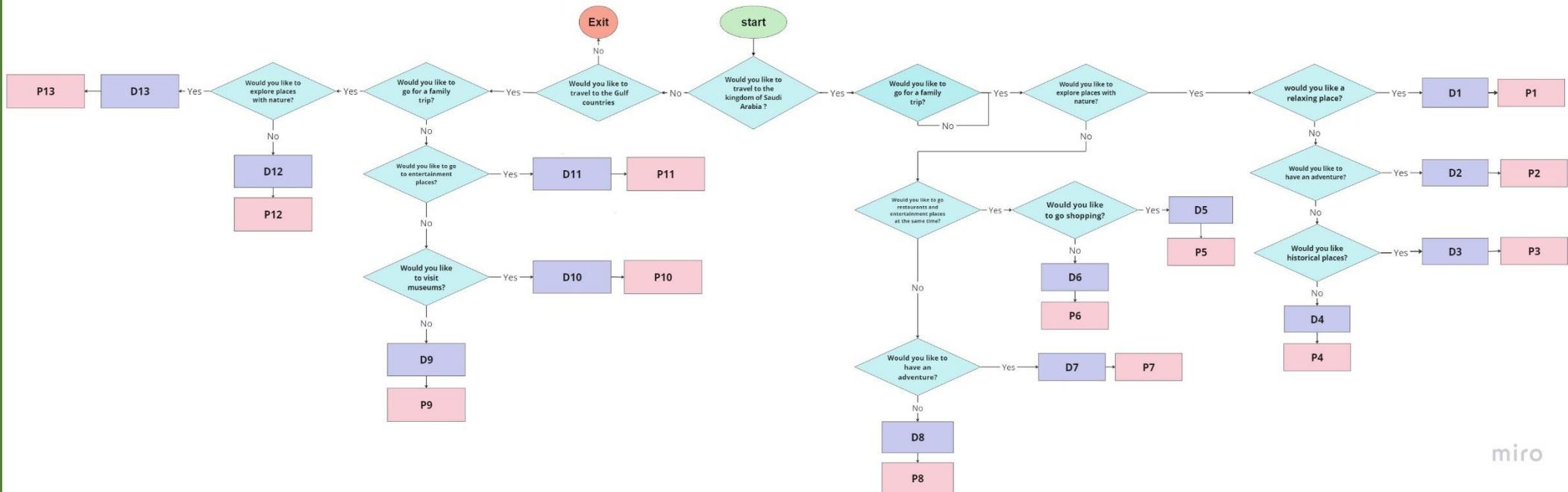


Figure 1: Flow diagram of the system

3.2 Tools

Table 4: Tool used to implement the system.

Tool	Purpose
SWI-Prolog online (SWISH)	Used to consult facts and rules to find the relationship between objects.

4. Implementation

SWI-Prolog online (SWISH) was used to implement this expert system, since it is a rule-based language that the system can use to infer recommendations based on user input and predefined rules. Thus, it is well-suited for developing a travel expert system that assists users in choosing their destination efficiently.

4.1 Code

The appendix will include the source code.

4.1.1 Start Rule

```
3 rahaal:-  
4 nl,write(""),nl,  
5 writeln('_____'),  
6 tab(18),  
7 writeln('_____ Welcome to Rahaal Travel Planner System! _____'),  
8 writeln('_____'),  
9 nl,  
10 tab(55),  
11 write('Hello! I am Rahaal 🧑•🌟'),nl,nl,  
12 write('I am here to help you find your best travel destination in Saudi Arabia and Gulf Countries'),nl,  
13 menu.
```

Figure 2: Start Rule

4.1.1 Menu

```
15 menu:-  
16 tab(20),  
17 write('Please answer the following questions, enter (1) for Yes, (2) for No'),nl,  
18 nl,nl,  
19 write(" 🧑•🌟: Would you like to travel to the kingdom of Saudi Arabia ?"),nl,  
20 write('1- Yes'),nl,  
21 write('2- No'),nl,nl,  
22  
23 read(Q1),  
24  
25 Q1 == 1 -> family_saudi(Q1) ;  
26 Q1 == 2 -> gulf_countries(Q1) ;  
27 tab(20),  
28 writeln('⚠ Invalid Input! You must enter either 1 or 2'),nl,  
29 menu  
30 ).
```

Figure 3: Menu Rule

4.1.2 Thanks message

```
454 thanks_message:-  
455 nl,tab(8),writeln('__ Thank you for using Rahaa 🧑✈️, enjoy your trip 😇❤️! __').
```

Figure 4: Thanks message

4.1.3 Preferences Rules

4.1.3.1 family_saudi

```
32 family_saudi(Q1):-  
33 nl,nl,  
34 write("🧑✈️: Would you like to go for a family trip?"),nl,  
35 write('1- Yes'),nl,  
36 write('2- No'),nl,nl,  
37 read(Q2),  
38 (  
39     Q2 ==:= 1 -> nature_saudi(Q1,Q2) ;  
40     Q2 ==:= 2 -> nature_saudi(Q1,Q2) ;  
41     tab(20),  
42     writeln('⚠ Invalid Input! You must enter either 1 or 2'),nl,  
43     family_saudi(Q1)  
44 ).
```

Figure 2: Family trip preference in Saudi Arabia

4.1.3.2 nature_saudi

```
46 nature_saudi(Q1,Q2):-  
47 nl,nl,  
48 write("🧑✈️: Would you like to explore places with nature?"),nl,  
49 write('1- Yes'),nl,  
50 write('2- No'),nl,nl,  
51 read(Q3),  
52 (  
53     Q3 ==:= 1 -> relaxing(Q1,Q2,Q3) ;  
54     Q3 ==:= 2 -> restaurants_entertainment(Q1,Q2,Q3);  
55     tab(20),  
56     writeln('⚠ Invalid Input! You must enter either 1 or 2'),nl,  
57     nature_saudi(Q1,Q2)  
58 ).
```

Figure 6: Natural trip preference in Saudi Arabia

4.1.3.3 restaurant_entertainment

```
60 restaurants_entertainment(Q1,Q2,Q3):-  
61 nl,nl,  
62 write(" 🧑 • ✈️: Would you like to go restaurants and entertainment places at the same time?"),nl,  
63 write('1- Yes'),nl,  
64 write('2- No'),nl,nl,  
65 read(Q7),  
66  
67 (  
68     Q7 ==:= 1 -> shopping(Q1,Q2,Q3,Q7) ;  
69     Q7 ==:= 2 -> adventure2(Q1,Q2,Q3,Q7);  
70     tab(20),  
71     writeln('⚠️ Invalid Input! You must enter either 1 or 2'),nl,  
72     restaurants_entertainment(Q1,Q2,Q3)  
73 ).
```

Figure 3: Restaurant and entertainment places at the same time trip preference in Saudi Arabia

4.1.3.4 relaxing

```
75 relaxing(Q1,Q2,Q3):-  
76 nl,nl,  
77 write(" 🧑 • ✈️: Would you like a relaxing place?"),nl,  
78 write('1- Yes'),nl,  
79 write('2- No'),nl,nl,  
80 read(Q4),  
81 (  
82     Q4 ==:= 1 -> dest_umluj(Q1,Q2,Q3,Q4) ;  
83     Q4 ==:= 2 -> adventure(Q1,Q2,Q3,Q4);  
84     tab(20),  
85     writeln('⚠️ Invalid Input! You must enter either 1 or 2'),nl,  
86     relaxing(Q1,Q2,Q3)  
87 ).
```

Figure 8: Relaxing trip preference in Saudi Arabia

4.1.3.5 adventure

```
89 adventure(Q1,Q2,Q3,Q4):-  
90 nl,nl,  
91 write(" 🧑 • ✈️: Would you like to have an adventure?"),nl,  
92 write('1- Yes'),nl,  
93 write('2- No'),nl,nl,  
94 read(Q5),  
95 (  
96     Q5 ==:= 1 -> dest_abha(Q1,Q2,Q3,Q4,Q5) ;  
97     Q5 ==:= 2 -> historical(Q1,Q2,Q3,Q4,Q5);  
98     tab(20),  
99     writeln('⚠️ Invalid Input! You must enter either 1 or 2'),nl,  
100    adventure(Q1,Q2,Q3,Q4)  
101 ).
```

Figure 9: Adventure trip preference in Saudi Arabia

4.1.3.6 historical

```
103 historical(Q1,Q2,Q3,Q4,Q5):-  
104 nl,nl,  
105 write("  Would you like historical places?"),nl,  
106 write('1- Yes'),nl,  
107 write('2- No'),nl,nl,  
108 read(Q6),  
109 (  
110     Q6 ==:= 1 -> dest_ula(Q1,Q2,Q3,Q4,Q5,Q6) ;  
111     Q6 ==:= 2 -> dest_taif(Q1,Q2,Q3,Q4,Q5,Q6);  
112     tab(20),  
113     writeln('  Invalid Input! You must enter either 1 or 2'),nl,  
114     historical(Q1,Q2,Q3,Q4,Q5)  
115 ).
```

Figure 10: Historical trip preference in Saudi Arabia

4.1.3.7 shopping

```
118 shopping(Q1,Q2,Q3,Q7):-  
119 nl,nl,  
120 write("  Would you like to go shopping?"),nl,  
121 write('1- Yes'),nl,  
122 write('2- No'),nl,nl,  
123 read(Q8),  
124 (  
125     Q8 ==:= 1 -> dest_riyadh(Q1,Q2,Q3,Q7,Q8) ;  
126     Q8 ==:= 2 -> dest_khobar(Q1,Q2,Q3,Q7,Q8);  
127     tab(20),  
128     writeln('  Invalid Input! You must enter either 1 or 2'),nl,  
129     shopping(Q1,Q2,Q3,Q7)  
130 ).
```

Figure 11: Shopping trip preference in Saudi Arabia

4.1.3.8 adventure2

```
132 adventure2(Q1,Q2,Q3,Q7):-  
133 nl,nl,  
134 write("  Would you like to have an adventure?"),nl,  
135 write('1- Yes'),nl,  
136 write('2- No'),nl,nl,  
137 read(Q9),  
138 (  
139     Q9 ==:= 1 -> dest_jeddah(Q1,Q2,Q3,Q7,Q9) ;  
140     Q9 ==:= 2 -> dest_makkah(Q1,Q2,Q3,Q7,Q9);  
141     tab(20),  
142     writeln('  Invalid Input! You must enter either 1 or 2'),nl,  
143     adventure2(Q1,Q2,Q3,Q7)  
144 ).
```

Figure 12: Adventure trip preference in Saudi Arabia

4.1.3.9 gulf_countries

```
148 gulf_countries(Q1):-  
149 nl,nl,  
150 write(" 🧑✈️: Would you like to travel to the Gulf countries"),nl,  
151 write('1- Yes'),nl,  
152 write('2- No'),nl,nl,  
153 read(Q10),  
154 (  
155     Q10 ==:= 1 -> family_gulf(Q1,Q10) ;  
156     Q10 ==:= 2 -> exit;  
157     tab(20),  
158     writeln('⚠ Invalid Input! You must enter either 1 or 2'),nl,  
159     gulf_countries(Q1)  
160 ).
```

Figure 13: Gulf countries trip preference

4.1.3.10 family_gulf

```
162 family_gulf(Q1,Q10):-  
163 nl,nl,  
164 write(" 🧑✈️: Would you like to go for a family trip?"),nl,  
165 write('1- Yes'),nl,  
166 write('2- No'),nl,nl,  
167 read(Q11),  
168 (  
169     Q11 ==:= 1 -> nature_gulf(Q1,Q10,Q11) ;  
170     Q11 ==:= 2 -> entertainment(Q1,Q10,Q11);  
171     tab(20),  
172     writeln('⚠ Invalid Input! You must enter either 1 or 2'),nl,  
173     family_gulf(Q1,Q10)  
174 ).
```

Figure 14: Family trip preference in Gulf countries

4.1.3.11 nature_gulf

```
176 nature_gulf(Q1,Q10,Q11):-  
177 nl,nl,  
178 write(" 🧑✈️: Would you like to explore places with nature?"),nl,  
179 write('1- Yes'),nl,  
180 write('2- No'),nl,nl,  
181 read(Q12),  
182 (  
183     Q12 ==:= 1 -> dest_oman(Q1,Q10,Q11,Q12) ;  
184     Q12 ==:= 2 -> dest_dubai(Q1,Q10,Q11,Q12);  
185     tab(20),  
186     writeln('⚠ Invalid Input! You must enter either 1 or 2'),nl,  
187     nature_gulf(Q1,Q10,Q11)  
188 ).
```

Figure 15: Natural trip preference in Gulf countries

4.1.3.12 entertainment

```
190 entertainment(Q1,Q10,Q11):-  
191 nl,nl,  
192 write("   : Would you like to go to entertainment places?"),nl,  
193 write('1- Yes'),nl,  
194 write('2- No'),nl,nl,  
195 read(Q13),  
196 (  
197     Q13 == 1 -> dest_kuwait(Q1,Q10,Q11,Q13) ;  
198     Q13 == 2 -> museums(Q1,Q10,Q11,Q13);  
199     tab(20),  
200     writeln('⚠ Invalid Input! You must enter either 1 or 2'),nl,  
201     entertainment(Q1,Q10,Q11)  
202 ).
```

Figure 16: Entertainment trip preference in Gulf countries

4.1.3.13 museums

```
204 museums(Q1,Q10,Q11,Q13):-  
205 nl,nl,  
206 write("   : Would you like to visit museums?"),nl,  
207 write('1- Yes'),nl,  
208 write('2- No'),nl,nl,  
209 read(Q14),  
210 (  
211     Q14 == 1 -> dest_bahrain(Q1,Q10,Q11,Q13,Q14) ;  
212     Q14 == 2 -> dest_qatar(Q1,Q10,Q11,Q13,Q14);  
213     tab(20),  
214     writeln('⚠ Invalid Input! You must enter either 1 or 2'),nl,  
215     museums(Q1,Q10,Q11,Q13)  
216 ).
```

Figure 17: museums trip preference in Gulf countries

4.1.4 Destination Rules

4.1.4.1 dest_umluj

```
218 dest_umluj(Q1,Q2,Q3,Q4):-  
219 nl,  
220 tab(5),  
221 write("  Based on your preferences,"),  
222 write(' Umluj'),  
223 write(" can be your destination  "),nl,  
224 plan1.
```

Figure 18: Umluj as suggested destination

4.1.4.2 dest_abha

```
226 dest_abha(Q1,Q2,Q3,Q4,Q5) :-  
227   nl,  
228   tab(5),  
229   write("✈ Based on your preferences,"),  
230   write(' Abha'),  
231   write(" can be your destination ✈"),nl,  
232   plan2.
```

Figure 19: Abha as suggested destination

4.1.4.3 dest_ula

```
234 dest_ula(Q1,Q2,Q3,Q4,Q5,Q6) :-  
235   nl,  
236   tab(5),  
237   write("✈ Based on your preferences,"),  
238   write(' Al-Ula'),  
239   write(" can be your destination ✈"),nl,  
240   plan3.
```

Figure 20: Ula as suggested destination

4.1.4.4 dest_taif

```
242 dest_taif(Q1,Q2,Q3,Q4,Q5,Q6) :-  
243   nl,  
244   tab(5),  
245   write("✈ Based on your preferences,"),  
246   write(' Taif'),  
247   write(" can be your destination ✈"),nl,  
248   plan4.
```

Figure 21: Taif as suggested destination

4.1.4.5 dest_riyadh

```
250 dest_riyadh(Q1,Q2,Q3,Q7,Q8) :-  
251   nl,  
252   tab(5),  
253   write("✈ Based on your preferences,"),  
254   write(' Riyadh'),  
255   write(" can be your destination ✈"),nl,  
256   plan5.
```

Figure 22: Riyadh as suggested destination

4.1.4.6 dest_khobar

```
258 dest_khobar(Q1,Q2,Q3,Q7,Q8):-  
259 nl,  
260 tab(5),  
261 write("✈ Based on your preferences,"),  
262 write(' Al-khobar'),  
263 write(" can be your destination ✈"),nl,  
264 plan6.
```

Figure 23:Khobar as suggested destination

4.1.4.7 dest_jeddah

```
266 dest_jeddah(Q1,Q2,Q3,Q7,Q9):-  
267 nl,  
268 tab(5),  
269 write("✈ Based on your preferences,"),  
270 write(' Jeddah'),  
271 write(" can be your destination ✈"),nl,  
272 plan7.
```

Figure 24: Jeddah as suggested destination

4.1.4.8 dest_makkah

```
274 dest_makkah(Q1,Q2,Q3,Q7,Q9):-  
275 nl,  
276 tab(5),  
277 write("✈ Based on your preferences,"),  
278 write(' Makkah'),  
279 write(" can be your destination ✈"),nl,  
280 plan8.
```

Figure 25: Makkah as suggested destination

4.1.4.9 dest_oman

```
282 dest_oman(Q1,Q10,Q11,Q12):-  
283 nl,  
284 tab(5),  
285 write("✈ Based on your preferences,"),  
286 write(' Oman'),  
287 write(" can be your destination ✈"),nl,  
288 plan9.
```

Figure 26: Oman as suggested destination

4.1.4.10 dest_dubai

```
290 dest_dubai(Q1,Q10,Q11,Q12):-  
291   nl,  
292   tab(5),  
293   write("✈ Based on your preferences,"),  
294   write(' Dubai'),  
295   write(" can be your destination ✈"),nl,  
296   plan10.
```

Figure 27: Dubai as suggested destination

4.1.4.11 dest_kuwait

```
298 dest_kuwait(Q1,Q10,Q11,Q13):-  
299   nl,  
300   tab(5),  
301   write("✈ Based on your preferences,"),  
302   write(' Kuwait'),  
303   write(" can be your destination ✈"),nl,  
304   plan11.
```

Figure 28: Kuwait as suggested destination

4.1.4.12 dest_bahrain

```
306 dest_bahrain(Q1,Q10,Q11,Q13,Q14):-  
307   nl,  
308   tab(5),  
309   write("✈ Based on your preferences,"),  
310   write(' Bahrain'),  
311   write(" can be your destination ✈"),nl,  
312   plan12.
```

Figure 29: Bahrain as suggested destination

4.1.4.13 dest_qatar

```
314 dest_qatar(Q1,Q10,Q11,Q13,Q14):-  
315   nl,  
316   tab(5),  
317   write("✈ Based on your preferences,"),  
318   write(' Qatar'),  
319   write(" can be your destination ✈"),nl,  
320   plan13.
```

Figure 30: Qatar as suggested destination

4.1.4.14 exit

This rule will be fired when the user choose option other than traveling to Saudi Arabia or gulf countries.

```
322 exit:-  
323 writeln("Sorry :( , This system is just for Saudi Arabia and Gulf Countries."),nl.
```

Figure 31: Exit rule

4.1.5 Plans Rules

4.1.5.1 Plan 1

```
329 plan1:-  
330 nl,tab(5),  
331 writeln('____ Here is a suggested plan to do in Umluj 🏝! ____'),  
332 writeln(""),  
333 writeln("Starting with the Waves Hotel. Then, the silk sand beach or the Duqm island. And if you are a yoga lover"),  
334 writeln("you can take yoga classes during the sunset while you are on the beach of Umluj."),  
335 writeln('____'),  
336 thanks_message.
```

Figure 32: Umluj plan

4.1.5.2 Plan 2

```
338 plan2:-  
339 nl,  
340 writeln('____ Here is a suggested plan to do in Abha 🏔! ____'),  
341 writeln(""),  
342 writeln("Starting from the Dabbab walkway, to the telefrcic. After that, hiking the Souda Mountain."),  
343 writeln("Also, visit Al Masgi Park. Then, explore the Bees Tower Honey Refinery."),  
344 writeln('____'),  
345 thanks_message.
```

Figure 33: Abha plan

4.1.5.3 Plan 3

```
347 plan3:-  
348 nl,  
349 writeln('____ Here is a suggested plan to do in Al-Ula 🏰! ____'),  
350 writeln(""),  
351 writeln("starting from Al-Ula Old Town to the amazing Elephant Rock. After that,"),  
352 writeln("the Maraya Concert Hall, and then explore Madain Saleh."),  
353 writeln('____'),  
354 thanks_message.
```

Figure 34: Al-Ula plan

4.1.5.4 Plan 4

```
356 plan4:-  
357 nl,  
358 writeln('____ Here is a suggested plan to do in Taif 🏔! ____'),  
359 writeln(""),  
360 writeln("Starting from La Fontaine Alshafa resort, then going to the Taif City Walk."),  
361 writeln("After that, exploring the strawberrys farm in Alhada."),  
362 writeln('____'),  
363 thanks_message.
```

Figure 35: Taif plan

4.1.5.5 Plan 5

```
365 plan5:-  
366 nl,  
367 writeln('_____ Here is a suggested plan to do in Riyadh 🏐! _____'),  
368 writeln(""),  
369 writeln("Shopping and exploring restaurants at the Boulevard City and Riyadh Park mall. After that,"),  
370 writeln("going to Murabba Historical Palace. Lastly, have an unforgettable adventure with the camel-back"),  
371 writeln("safari at nofa ."),  
372 writeln('_____'),  
373 thanks_message.
```

Figure 36: Riyadh plan

4.1.5.6 Plan 6

```
375 plan6:-  
376 nl,  
377 writeln('_____ Here is a suggested plan to do in Al-khobar 🏙! _____'),  
378 writeln(""),  
379 writeln("Starting from exploring restaurants in Ajdan Walk, then watching a movie in the cinema."),  
380 writeln("After that, going to the Escape Room which is a real-life experience, and then to Gravity trampolines."),  
381 writeln('_____'),  
382 thanks_message.
```

Figure 37: Al-Khobar plan

4.1.5.7 Plan 7

```
384 plan7:-  
385 nl,  
386 writeln('_____ Here is a suggested plan to do in Jeddah 🌄☀️! _____'),  
387 writeln(""),  
388 writeln("Starting from Historic Jeddah, and then going on a Scuba Diving Tour. After that, going to Arabian horse-riding"),  
389 writeln("at the red sea, and camping in the Al-Balaj camp."),  
390 writeln('_____'),  
391 thanks_message.
```

Figure 38: Jeddah plan

4.1.5.8 Plan 8

```
393 plan8:-  
394 nl,  
395 writeln('_____ Here is a suggested plan to do in Makkah 🚧! _____'),  
396 writeln(""),  
397 writeln("Make umrah and explore nearby sites. Then, to Al Madinah Al Munawwarah to visit the Al Masjid Al Nabawi."),  
398 writeln('_____'),  
399 thanks_message.
```

Figure 39: Makkah plan

4.1.5.9 Plan 9

```
401 plan9:-  
402 nl,  
403 writeln('_____ Here is a suggested plan to do in Oman 🇴;! _____'),  
404 writeln(""),  
405 writeln("Darbar Waterfall and wadi Shab are great places to enjoy the beauty of nature. Explore the breathtaking"),  
406 writeln("canyons and valleys in the East Salalah Mountain and stay in Sheraton Oman Hotel or if you want an amazing"),  
407 writeln("beach view, go to the InterContinental Muscat Hotel."),  
408 writeln('_____'),  
409 thanks_message.
```

Figure 40: Oman plan

4.1.5.10 Plan 10

```
411 plan10:-  
412 nl,  
413 writeln('_____ Here is a suggested plan to do in Dubai 🇦🇪 • 🏠 • 🎪 • 🌍 ! _____'),  
414 writeln(""),  
415 writeln("Start with Discovering Dubai Mall, then dive into underwater adventure at Dubai Aquarium & Underwater Zoo."),  
416 writeln("After that watch Dubai Fountain where water, music, and light come together creating a spectacular show."),  
417 writeln("To further enrich your Dubai experience, make your way to Global Village to explore cultures, cuisines from"),  
418 writeln("around the world."),  
419 writeln('_____'),  
420 writeln('_____'),  
421 thanks_message.
```

Figure 41: Dubai plan

4.1.5.11 Plan11

```
422 plan11:-  
423 nl,  
424 writeln('_____ Here is a suggested plan to do in Kuwait 🇰🇼 • 🎪 ! _____'),  
425 writeln(""),  
426 writeln("Visit the paintball Kuwait to play a high intensity game that give you the chance to shoot your friends"),  
427 writeln("without causing harm. Then, play 'Escape the Room' where you and your team must work together to solve "),  
428 writeln("puzzles in Dream Factory. Also, enjoy the water slides in Aqua Park. Finally, attend a play in one of the"),  
429 writeln("largest theatres which is the JACC national theatre."),  
430 writeln('_____'),  
431 writeln('_____'),  
432 thanks_message.
```

Figure 42: Kuwait plan

4.1.5.12 Plan12

```
433 plan12:-  
434 nl,  
435 writeln('_____ Here is a suggested plan to do in Bahrain 🇲🇭 • 🏛 ! _____'),  
436 writeln(""),  
437 writeln("Visit the Bahrain National Museum to explore the rich history and cultural of Bahrain. Also, the Busaad"),  
438 writeln("Art Gallery to enjoy the contemporary artworks. Take a glimpse of the Bahrain's military history at the"),  
439 writeln("Bahrain Military Museum. Lastly, Enjoy the traditional food in Freej Bin Rashdan Bahraini Cuisine."),  
440 writeln('_____'),  
441 writeln('_____'),  
442 thanks_message.
```

Figure 43: Bahrain plan

4.1.5.13 Plan13

```
443 plan13:-  
444 nl,  
445 writeln('_____ Here is a suggested plan to do in Qatar 🇶🇦 • 🏛 ! _____'),  
446 writeln(""),  
447 writeln("Visit Souq waqif to see the traditional Qatari building and buy local products. Then go to Katara"),  
448 writeln("cultural village. Also, you can resides in The Pearl island that has luxurious outlets, restaurants,"),  
449 writeln("cafes, and entertainment venues. Moreover, you can visit Lusail Corniche, Banana Island, Mashaireb, " ),  
450 writeln("and old Doha port."),  
451 writeln('_____'),  
452 writeln('_____'),  
453 thanks_message.
```

Figure 44: Qatar plan

5. Testing and Evaluation

We tested the system by performing different cases. The following are test cases for the Saudi Arabia and The Gulf Countries Travel Planner System (Rahaal).

5.1 Start Output



Figure 45: Start output

5.2 Test Cases

5.2.1 Case 1: Umluj Trip

The figure below shows a test case for Case 1 and provides the users with a suitable destination based on their preferences and suggested plan.

🙋 : Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

1

🙋 : Would you like to go for a family trip?
1- Yes
2- No

1

🙋 : Would you like to explore places with nature?
1- Yes
2- No

1

🙋 : Would you like a relaxing place?
1- Yes
2- No

1

✈️ Based on your preferences, Umluj can be your destination ✈️

___ Here is a suggested plan to do in Umluj 🎉 ! ___

Starting with the Waves Hotel. Then, the silk sand beach or the Duqm island. And if you are a yoga lover you can take yoga classes during the sunset while you are on the beach of Umluj.

___ Thank you for using Rahaa 🧑, enjoy your trip 😊❤️ ! ___
true

Figure 46: Case 1 Umluj Trip

5.2.2 Case 2: Abha Trip

The figure below shows a test case for Case 2 and provides the users with a suitable destination based on their preferences and suggested plan.

👤 : Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

1

👤 : Would you like to go for a family trip?
1- Yes
2- No

1

👤 : Would you like to explore places with nature?
1- Yes
2- No

1

👤 : Would you like a relaxing place?
1- Yes
2- No

2

👤 : Would you like to have an adventure?
1- Yes
2- No

1

✈️ Based on your preferences, **Abha** can be your destination ✈️

Here is a suggested plan to do in Abha 🎉 !

Starting from the Dabbab walkway, to the telefrc. After that, hiking the Souda Mountain. Also, visit Al Masgi Park. Then, explore the Bees Tower Honey Refinery.

___ Thank you for using Rahaa 🚩 , enjoy your trip 😊❤️ ! ___

true

Figure 47:Case 2 Abha Trip

5.2.3 Case 3: Al-Ula Trip

The figure below shows a test case for Case 3 and provides the users with a suitable destination based on their preferences and suggested plan.

1: Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

1

2: Would you like to go for a family trip?
1- Yes
2- No

1

3: Would you like to explore places with nature?
1- Yes
2- No

1

4: Would you like a relaxing place?
1- Yes
2- No

2

5: Would you like to have an adventure?
1- Yes
2- No

2

6: Would you like historical places?
1- Yes
2- No

1

Based on your preferences, Al-Ula can be your destination

Here is a suggested plan to do in Al-Ula 📸! starting from Al-Ula Old Town to the amazing Elephant Rock. After that, the Maraya Concert Hall, and then explore Madain Saleh.

Thank you for using Rahaa 🧑, enjoy your trip 😊❤️!

Figure 48: Case 3 Al-Ula Trip

5.2.4 Case 4: Al Taif Trip

The figure below shows a test case for Case 4 and provides the users with a suitable destination based on their preferences and suggested plan.

👤: Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

1

👤: Would you like to go for a family trip?
1- Yes
2- No

1

👤: Would you like to explore places with nature?
1- Yes
2- No

1

👤: Would you like a relaxing place?
1- Yes
2- No

2

👤: Would you like to have an adventure?
1- Yes
2- No

2

👤: Would you like historical places?
1- Yes
2- No

2

✈️ Based on your preferences, Taif can be your destination ✈️

Here is a suggested plan to do in Taif 🏔️🌳!

Starting from La Fontaine Alshafa resort, then going to the Taif City Walk. After that, exploring the strawberries farm in Alhada.

— Thank you for using Rahaa 🧑, enjoy your trip 😊❤️! —
true

Figure 49: Case 4 Taif Trip

5.2.5 Case 5: Riyadh Trip

The figure below shows a test case for Case 5 and provides the users with a suitable destination based on their preferences and suggested plan.

👤 : Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

1

👤 : Would you like to go for a family trip?
1- Yes
2- No

1

👤 : Would you like to explore places with nature?
1- Yes
2- No

2

👤 : Would you like to go restaurants and entertainment places at the same time?
1- Yes
2- No

1

👤 : Would you like to go shopping?
1- Yes
2- No

1

✈️ Based on your preferences, Riyadh can be your destination ✈️

___ Here is a suggested plan to do in Riyadh 🎉! ___

Shopping and exploring restaurants at the Boulevard City and Riyadh Park mall. After that, going to Murabba Historical Palace. Lastly, have an unforgettable adventure with the camel-back safari at nofa .

___ Thank you for using Rahaa 🧑, enjoy your trip 😊❤️! ___

true

Figure 50: Case 5 Riyadh Trip

5.2.6 Case 6: Al Khobar Trip

The figure below shows a test case for Case 6 and provides the users with a suitable destination based on their preferences and suggested plan.

👤 : Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

1

👤 : Would you like to go for a family trip?
1- Yes
2- No

1

👤 : Would you like to explore places with nature?
1- Yes
2- No

2

👤 : Would you like to go restaurants and entertainment places at the same time?
1- Yes
2- No

1

👤 : Would you like to go shopping?
1- Yes
2- No

2

✈️ Based on your preferences, **Al-khobar** can be your destination ✈️

Here is a suggested plan to do in Al-khobar 🎉 !

Starting from exploring restaurants in Ajdan Walk, then watching a movie in the cinema.
After that, going to the Escape Room which is a real-life experience, and then to Gravity trampolines.

___ Thank you for using Rahaa 🤖 , enjoy your trip 😊❤️ ! ___

true

Figure 51: Case 6 Al Khobar Trip

5.2.7 Case 7: Jeddah Trip

The figure below shows a test case for Case 7 and provides the users with a suitable destination based on their preferences and suggested plan.

👤 : Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

1

👤 : Would you like to go for a family trip?
1- Yes
2- No

1

👤 : Would you like to explore places with nature?
1- Yes
2- No

2

👤 : Would you like to go restaurants and entertainment places at the same time?
1- Yes
2- No

2

👤 : Would you like to have an adventure?
1- Yes
2- No

1

✈️ Based on your preferences, **Jeddah** can be your destination ✈️

Here is a suggested plan to do in Jeddah 🎉☀️! _____

Starting from Historic Jeddah, and then going on a Scuba Diving Tour. After that, going to Arabian horse-riding at the red sea, and camping in the Al-Balaj camp.

___ Thank you for using Rahaa 🧑, enjoy your trip 😊❤️! ___

true

Figure 52: Case 7 Jeddah Trip

5.2.8 Case 8: Makkah Trip

The figure below shows a test case for Case 8 and provides the users with a suitable destination based on their preferences and suggested plan.

Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No
1

Would you like to go for a family trip?
1- Yes
2- No
1

Would you like to explore places with nature?
1- Yes
2- No
2

Would you like to go restaurants and entertainment places at the same time?
1- Yes
2- No
2

Would you like to have an adventure?
1- Yes
2- No
2

Based on your preferences, Makkah can be your destination

Here is a suggested plan to do in Makkah

Make umrah and explore nearby sites. Then, to Al Madinah Al Munawwarah to visit the Al Masjid Al Nabawi.

Thank you for using Rahaa, enjoy your trip 😊❤️!

true

Figure 53: Case 8 Makkah Trip

5.2.9 Case 9: Qatar Trip

The figure below shows a test case for Case 9 and provides the users with a suitable destination based on their preferences and suggested plan.

👤 : Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

2

👤 : Would you like to travel to the Gulf countries
1- Yes
2- No

1

👤 : Would you like to go for a family trip?
1- Yes
2- No

2

👤 : Would you like to go to entertainment places?
1- Yes
2- No

2

👤 : Would you like to visit museums?
1- Yes
2- No

2

✈️ Based on your preferences, **Qatar** can be your destination ✈️

Here is a suggested plan to do in Qatar 🎉!

Visit Souq waqif to see the traditional Qatari building and buy local products. Then go to Katara cultural village. Also, you can reside in The Pearl island that has luxurious outlets, restaurants, cafes, and entertainment venues. Moreover, you can visit Lusail Corniche, Banana Island, Mashaireb, and old Doha port.

___ Thank you for using Rahaa 🌟, enjoy your trip 😊❤️! ___

true

Figure 54: Case 9 Qatar Trip

5.2.10 Case 10: Bahrain Trip

The figure below shows a test case for Case 10 and provides the users with a suitable destination based on their preferences and suggested plan.

👤 : Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

2

👤 : Would you like to travel to the Gulf countries
1- Yes
2- No

1

👤 : Would you like to go for a family trip?
1- Yes
2- No

2

👤 : Would you like to go to entertainment places?
1- Yes
2- No

2

👤 : Would you like to visit museums?
1- Yes
2- No

1

✈️ Based on your preferences, Bahrain can be your destination ✈️

Here is a suggested plan to do in Bahrain 🇲🇭🏛️🎭 !

Visit the Bahrain National Museum to explore the rich history and cultural of Bahrain. Also, the Busaad Art Gallery to enjoy the contemporary artworks. Take a glimpse of the Bahrain's military history at the Bahrain Military Museum. Lastly, Enjoy the traditional food in Freej Bin Rashdan Bahraini Cuisine.

___ Thank you for using Rahaa 🧑, enjoy your trip 😊❤️ ! ___

true

Figure 55: Case 10 Bahrain Trip

5.2.11 Case 11: Kuwait Trip

The figure below shows a test case for Case 11 and provides the users with a suitable destination based on their preferences and suggested plan.

👤: Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

2

👤: Would you like to travel to the Gulf countries
1- Yes
2- No

1

👤: Would you like to go for a family trip?
1- Yes
2- No

2

👤: Would you like to go to entertainment places?
1- Yes
2- No

1

✈️ Based on your preferences, Kuwait can be your destination ✈️

Here is a suggested plan to do in Kuwait 🇰🇼☀️!

Visit the paintball Kuwait to play a high intensity game that give you the chance to shoot your friends without causing harm. Then, play 'Escape the Room' where you and your team must work together to solve puzzles in Dream Factory. Also, enjoy the water slides in Aqua Park. Finally, attend a play in one of the largest theatres which is the JACC national theatre.

___ Thank you for using Rahaa 🧑, enjoy your trip 😊❤️! ___
true

Figure 56: Case 11 Kuwait Trip

5.2.12 Case 12: Dubai Trip

The figure below shows a test case for Case 12 and provides the users with a suitable destination based on their preferences and suggested plan.

👤 : Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

2

👤 : Would you like to travel to the Gulf countries
1- Yes
2- No

1

👤 : Would you like to go for a family trip?
1- Yes
2- No

1

👤 : Would you like to explore places with nature?
1- Yes
2- No

2

✈️ Based on your preferences, Dubai can be your destination ✈️

Here is a suggested plan to do in Dubai 🇦🇪!

Start with Discovering Dubai Mall, then dive into underwater adventure at Dubai Aquarium & Underwater Zoo. After that watch Dubai Fountain where water, music, and light come together creating a spectacular show. To further enrich your Dubai experience, make your way to Global Village to explore cultures, cuisines from around the world.

___ Thank you for using Rahaa 🧑, enjoy your trip 😊❤️! ___
true

Figure 57: Case 12 Dubai Trip

5.2.13 Case 13: Oman Trip

The figure below shows a test case for Case 13 and provides the users with a suitable destination based on their preferences and suggested plan.

👤 : Would you like to travel to the kingdom of Saudi Arabia ?
1- Yes
2- No

2

👤 : Would you like to travel to the Gulf countries
1- Yes
2- No

1

👤 : Would you like to go for a family trip?
1- Yes
2- No

1

👤 : Would you like to explore places with nature?
1- Yes
2- No

1

✈️ Based on your preferences, **Oman** can be your destination ✈️

Here is a suggested plan to do in Oman 🇴🇲 !

Darbar Waterfall and wadi Shab are great places to enjoy the beauty of nature. Explore the breathtaking canyons and valleys in the East Salalah Mountain and stay in Sheraton Oman Hotel or if you want an amazing beach view, go to the InterContinental Muscat Hotel.

— Thank you for using Rahaa 🤖, enjoy your trip 😊❤️! —
true

Figure 58: Case 13 Oman Trip

5.3 Error Handling

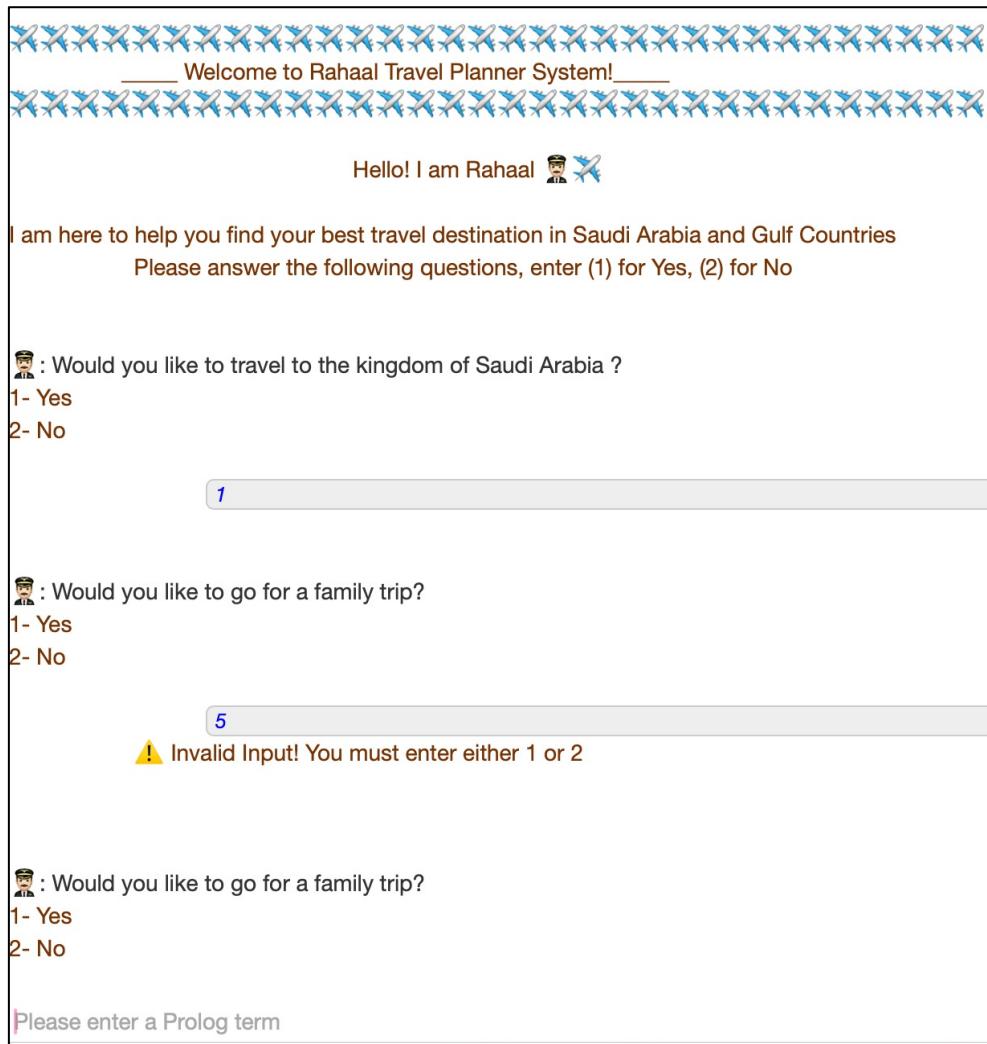


Figure 59: Error handling