Name: _____ Vergara, Ivyann Romijn H. _____

Student Number: _____ 2020-00761 _____   Section: _____ T-3L _____

I. Determine if the term is valid or not. If the term is valid, determine if it is an atom or a variable. Else, state why it is not a valid term.

#	Term	Valid (Y/N?)	Atom/Variable?
1	a_n_e_m_o_c_u_l_u_s_65	Y	Atom
2	_____	Y	Variable
3	TsUrUm1_1sL4nD	Y	Variable
4	aMBER	Y	Atom
5	SkywardAtlas1	Y	Variable
6	q1x1nG_g3n3r4L_s3cr3t4ry	Y	Atom
7	'moss!, viola!, rose!'	Y	Atom
8	7ARCHONS	N	Must start with upper-case/lower-case lettet or underscore
9	_wisdom_of_bansei	Y	Variable
10	Kamisato Ayato	N	Must be enclosed in single quotes

II. Determine if the term is a valid complex term, and if valid, identify the functor and the arity. Else, state why it is not a valid complex term.

#	Complex Term	Valid Complex Term (Y/N?)	Functor	Arity
1	boss_opponents(liyue(oceanid), liyue('primo_geovishap'), inazuma(maguu_kenki), inazuma('thunder manifestation'), sumeru(Jadeplume_terrorshroom)).	Y	boss_opponents	5
2	Story_Quests('Sea of Clouds, Sea of People', 'A Strange and Friendless Road').	N	Needs to be an atom. Should start with lower-case letter	
3	domains(artifacts(momiji_dyed_court, 'slumbering court'), weapon_materials(court_of_flowing_sands), talent_materials(violet_court)).	Y	domains	3
4	inazuma_artifact_set('ocean-hued clams', 'husk of opulent dreams', vermillion_hereafter, 'emblem of_severed fate').	Y	inazuma_artifact_set	4
5	_adventurers_guild(Fischl, Bennett, Katheryne).	N	Needs to be an atom. Should start with lower-case letter	
6	totalPlayableCryoCharacters(10).	Y	totalPlayableCryoCharacters	1
7	hangouts(noelle('chivalric training', ('knightly exam prep')), diona('the cat and the cocktail')).	Y	hangouts	2
8	'Geo Characters'(Ningguang, noelle, zhOngl1, Albedo, gorou, 'Arataki Itto').	Y	'Geo Characters'	6
9	gunnhildr_clan(gunnhildr(echkhard (frederica(jean, barbara)))).	Y	gunhildr_clan	1
10	5WeaponType(Sword, Bow, Claymore, Catalyst, Polearm).	N	Needs to be an atom. Should start with lower-case letter	

III. Convert the following statements into a knowledge base, and give Prolog's answer to the specified queries. Write your knowledge base, the command you used for each query and the result given to you by Prolog. Make sure that only one answer will be given by the query command you will use.

Statements:
Childe gets a good weapon.
Jean gets a good weapon.
Heechul completes an artifact set Heizou.
Heechul completes an artifact set for Jean.
Heechul ascends Kazuha's talents.
Heechul ascends Childe's talents.
Eunhyuk completes an artifact set for Kazuha.
Eunhyuk completes an artifact set for Childe.
Eunhyuk ascends Jean's talents.
Eunhyuk ascends Heizou's talents.
Donghae completes an artifact set for Childe.
Donghae completes an artifact set Heizou.
Donghae ascends Kazuha's talents.
Donghae ascends Heizou's talents.
Kyuhyun completes an artifact set for Jean.
Kyuhyun completes an artifact set for Kazuha.
Kyuhyun ascends Heizou's talents.
Kyuhyun ascends Kazuha's talents.

A player's character becomes stronger if the player completes an artifact set for that character or if the character gets a good weapon and the player ascends the character's talent.

Queries:

1. Will Heechul's Heizou get stronger?

2. Will Heechul's Childe get stronger?

3. Will Heechul's Kazuha get stronger?

4. Will Eunhyuk's Kazuha get stronger?

5. Will Eunhyuk's Jean get stronger?

6. Will Eunhyuk's Heizou get stronger?

7. Will Donghae's Childe get stronger?

8. Will Donghae's Jean get stronger?

9. Will Kyuhyun's Childe get stronger?

10. Will Kyuhyun's Jean get stronger?

KNOWLEDGE BASE

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1    goodWeapon(childe).
2    goodWeapon(jean).
3    artifact_complete(heechul, heizou).
4    artifact_complete(heechul, jean).
5    artifact_complete(eunhyuk, kazuha).
6    artifact_complete(eunhyuk, childe).
7    artifact_complete(donghae, childe).
8    artifact_complete(donghae, heizou).
9    artifact_complete(kyuhyun, jean).
10   artifact_complete(kyuhyun, kazuha).
11   ascend_talent(heechul, kazuha).
12   ascend_talent(heechul, childe).
13   ascend_talent(eunhyuk, jean).
14   ascend_talent(eunhyuk, heizou).
15   ascend_talent(donghae, kazuha).
16   ascend_talent(donghae, heizou).
17   ascend_talent(kyuhyun, heizou).
18   ascend_talent(kyuhyun, kazuha).
19   stronger(X, Y) :- artifact_complete(X, Y) ; goodWeapon(Y), ascend_talent(X, Y).
```

QUERIES:

1. **Will Heechul's Heizou get stronger?**
   stronger(heechul, heizou), !.
   true.
2. **Will Heechul's Childe get stronger?**
   stronger(heechul, childe), !.
   true.
3. **Will Heechul's Kazuha get stronger?**
   stronger(heechul, kazuha), !.
   false.
4. **Will Eunhyuk's Kazuha get stronger?**
   stronger(eunhyuk, kazuha), !.
   true.
5. **Will Eunhyuk's Jean get stronger?**
   stronger(eunhyuk, jean), !.
   true.

6. **Will Eunhyuk's Heizou get stronger?**
   stronger(eunhyuk, heizou), !.
   false.
7. **Will Donghae's Childe get stronger?**
   stronger(donghae, childe), !.
   true.
8. **Will Donghae's Jean get stronger?**
   stronger(donghae, jean), !.
   false.
9. **Will Kyuhyun's Childe get stronger?**
   stronger(kyuhyun, childe), !.
   false.
10. **Will Kyuhyun's Jean get stronger?**
    stronger(kyuhyun, jean), !.
    true.