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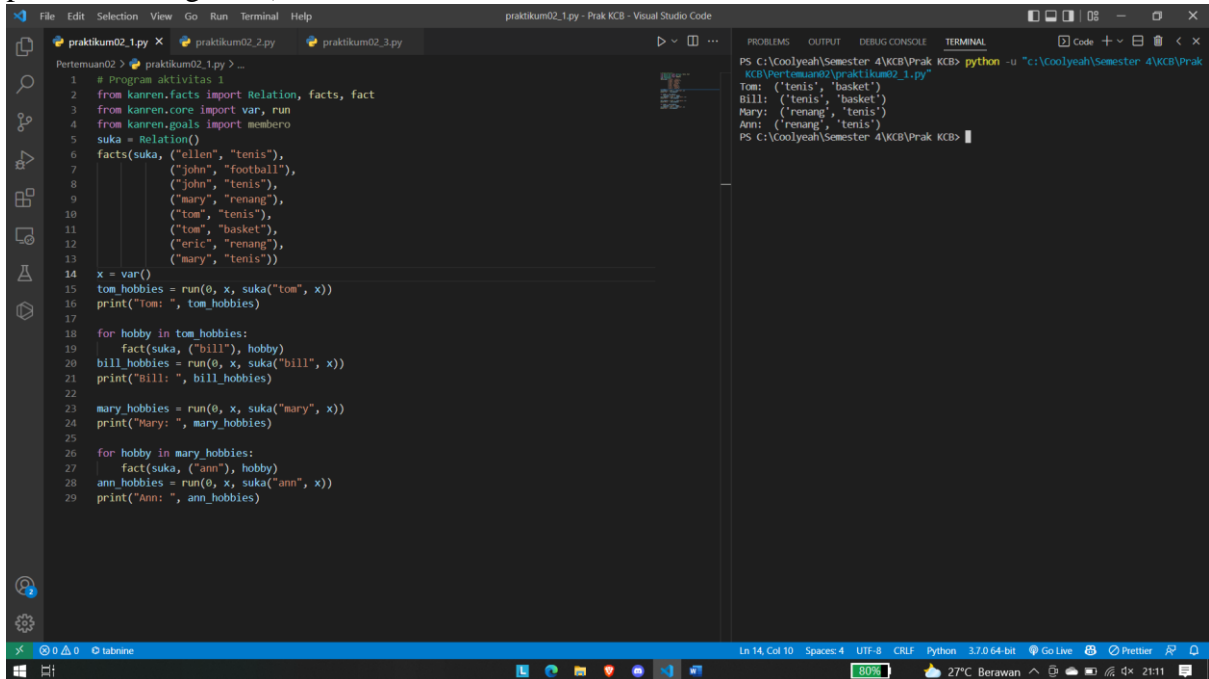
NIM : 2000018277

Slot : Sabtu 07.30

LANGKAH PRAKTIKUM KECERDASAN BUATAN

PERTEMUAN 2

1. Buatlah sebuah contoh implementasi python untuk kasus pelacakan (hasil pekerjaan praktikum langkah 6)

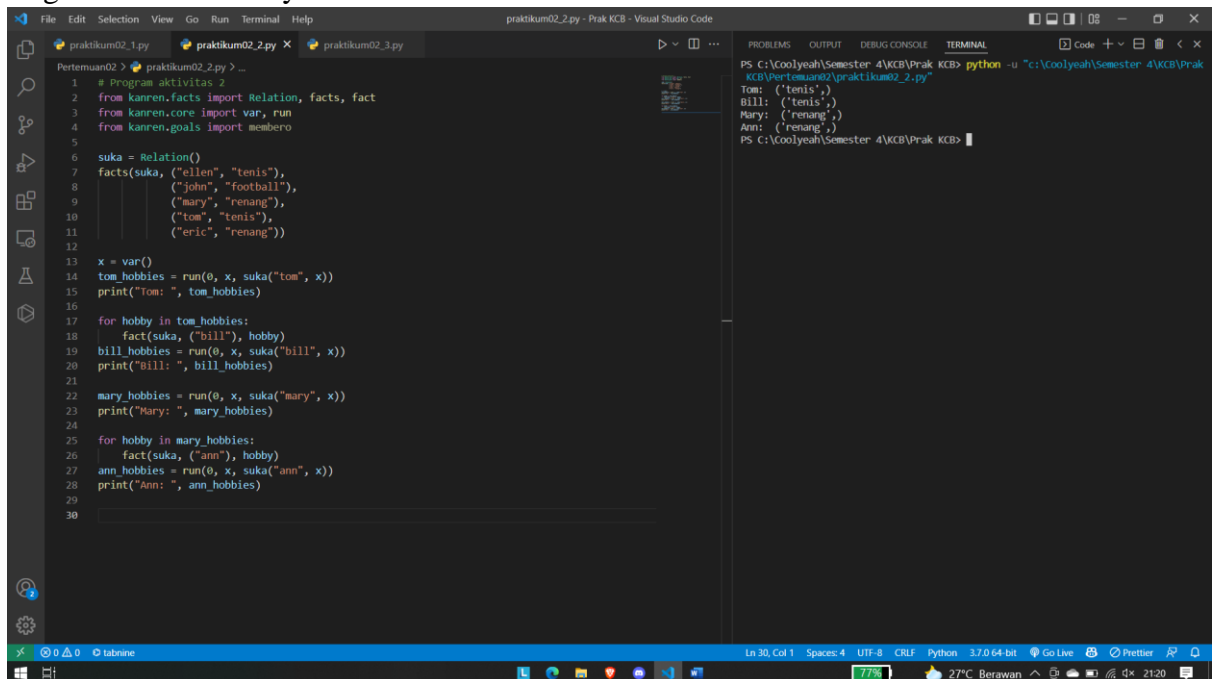


```
praktikum02_1.py
1 # Program aktivitas 1
2 from kanren.facts import Relation, facts, fact
3 from kanren.core import var, run
4 from kanren.goals import membero
5 suka = Relation()
6 facts(suka, ("ellen", "tenis"),
7        ("john", "football"),
8        ("john", "tenis"),
9        ("mary", "renang"),
10       ("tom", "tenis"),
11       ("tom", "basket"),
12       ("eric", "renang"),
13       ("mary", "tenis"))
14 x = var()
15 tom_hobbies = run(0, x, suka("tom", x))
16 print("Tom: ", tom_hobbies)
17
18 for hobby in tom_hobbies:
19     fact(suka, ("bill", hobby))
20 bill_hobbies = run(0, x, suka("bill", x))
21 print("Bill: ", bill_hobbies)
22
23 mary_hobbies = run(0, x, suka("mary", x))
24 print("Mary: ", mary_hobbies)
25
26 for hobby in mary_hobbies:
27     fact(suka, ("ann", hobby))
28 ann_hobbies = run(0, x, suka("ann", x))
29 print("Ann: ", ann_hobbies)
```

```
PS C:\Coolyeeah\Semester 4\KCB\Prak KCB> python -u "C:\Coolyeeah\Semester 4\KCB\Prak KCB\Pertemuan2\praktikum02_1.py"
Tom: ('tenis', 'basket')
Bill: ('tenis', 'basket')
Mary: ('renang', 'tenis')
Ann: ('renang', 'tenis')
```

2. Lakukan tugas praktikum langkah 7

- a. Bagaimanakah hasilnya?



```
praktikum02_2.py
1 # Program aktivitas 2
2 from kanren.facts import Relation, facts, fact
3 from kanren.core import var, run
4 from kanren.goals import membero
5
6 suka = Relation()
7 facts(suka, ("ellen", "tenis"),
8        ("john", "football"),
9        ("mary", "renang"),
10       ("tom", "tenis"),
11       ("eric", "renang"))
12
13 x = var()
14 tom_hobbies = run(0, x, suka("tom", x))
15 print("Tom: ", tom_hobbies)
16
17 for hobby in tom_hobbies:
18     fact(suka, ("bill", hobby))
19 bill_hobbies = run(0, x, suka("bill", x))
20 print("Bill: ", bill_hobbies)
21
22 mary_hobbies = run(0, x, suka("mary", x))
23 print("Mary: ", mary_hobbies)
24
25 for hobby in mary_hobbies:
26     fact(suka, ("ann", hobby))
27 ann_hobbies = run(0, x, suka("ann", x))
28 print("Ann: ", ann_hobbies)
29
30
```

```
PS C:\Coolyeeah\Semester 4\KCB\Prak KCB> python -u "C:\Coolyeeah\Semester 4\KCB\Prak KCB\Pertemuan2\praktikum02_2.py"
Tom: ('tenis',)
Bill: ('tenis',)
Mary: ('renang',)
Ann: ('renang',)
```

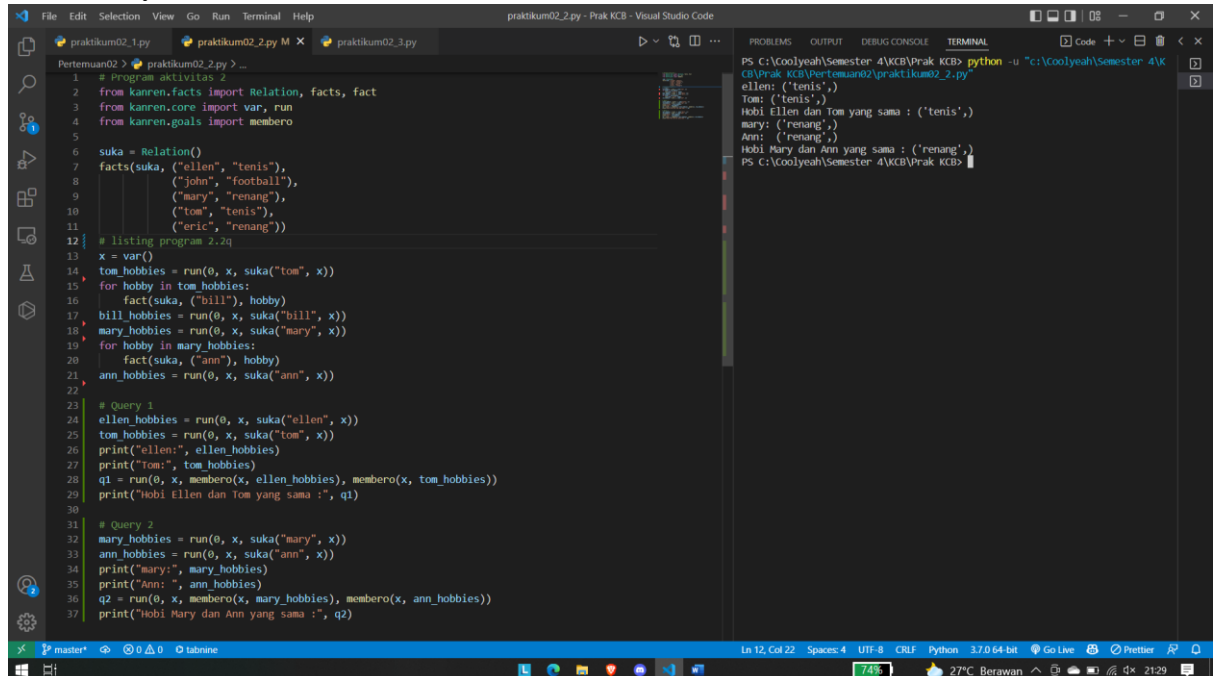
- b. Berdasarkan program pada listing 2.2 tersebut berikanlah goal di bawah ini untuk kedua program tersebut. Bagaimana hasilnya? (hint: gunakan membeo)

Query 1:

suka("ellen", x), suka("tom", x)

Query 1:

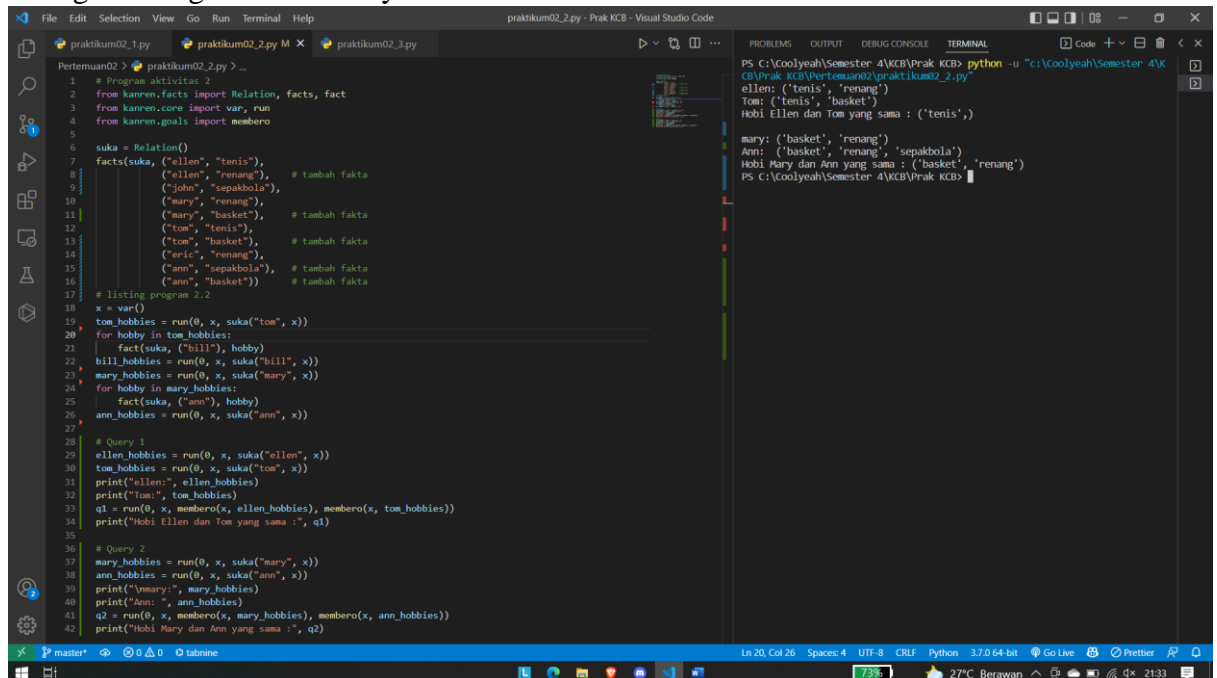
suka("mary", x), suka("ann", x)



The screenshot shows a Visual Studio Code editor with a Python file named 'praktikum02_2.py'. The code defines a 'Relation' class with methods for adding facts, running queries, and checking membership. It includes two queries: Query 1 (suka("ellen", x), suka("tom", x)) and Query 2 (suka("mary", x), suka("ann", x)). The output window shows the results of these queries, including the hobbies of Ellen, Tom, Mary, and Ann, and the common hobbies between them.

```
1 # Program aktivitas 2
2 from kanren.facts import Relation, facts, fact
3 from kanren.core import var, run
4 from kanren.goals import membro
5
6 suka = Relation()
7 facts(suka, ("ellen", "tenis"),
8       ("john", "football"),
9       ("mary", "renang"),
10      ("tom", "tenis"),
11      ("eric", "renang"))
12
13 # listing program 2.2q
14 x = var()
15 tom_hobbies = run(0, x, suka("tom", x))
16 for hobby in tom_hobbies:
17     fact(suka, ("bill", hobby))
18 bill_hobbies = run(0, x, suka("bill", x))
19 mary_hobbies = run(0, x, suka("mary", x))
20 for hobby in mary_hobbies:
21     fact(suka, ("ann", hobby))
22 ann_hobbies = run(0, x, suka("ann", x))
23
24 # Query 1
25 ellen_hobbies = run(0, x, suka("ellen", x))
26 tom_hobbies = run(0, x, suka("tom", x))
27 print("ellen:", ellen_hobbies)
28 print("tom:", tom_hobbies)
29 q1 = run(0, x, membro(x, ellen_hobbies), membro(x, tom_hobbies))
30 print("Hobi Ellen dan Tom yang sama :", q1)
31
32 # Query 2
33 mary_hobbies = run(0, x, suka("mary", x))
34 ann_hobbies = run(0, x, suka("ann", x))
35 print("mary:", mary_hobbies)
36 print("ann:", ann_hobbies)
37 q2 = run(0, x, membro(x, mary_hobbies), membro(x, ann_hobbies))
38 print("Hobi Mary dan Ann yang sama :", q2)
```

- c. Cobalah untuk menambahkan fakta-fakta baru untuk pengembangan program pada listing 2.2. Bagaimana hasilnya?



The screenshot shows the same Visual Studio Code editor with the modified 'praktikum02_2.py' file. New facts have been added to the 'suka' relation: ("ellen", "renang"), ("john", "sepakbola"), ("mary", "basket"), ("tom", "tenis"), ("tom", "basket"), ("eric", "renang"), ("ann", "sepakbola"), and ("ann", "basket"). The output window shows the updated results, including the new hobbies and the common hobbies between Ellen and Tom, Mary and Ann.

```
1 # Program aktivitas 2
2 from kanren.facts import Relation, facts, fact
3 from kanren.core import var, run
4 from kanren.goals import membro
5
6 suka = Relation()
7 facts(suka, ("ellen", "tenis"),
8       ("ellen", "renang"), # tambah fakta
9       ("john", "sepakbola"),
10      ("mary", "renang"),
11      ("mary", "basket"), # tambah fakta
12      ("tom", "tenis"),
13      ("tom", "basket"), # tambah fakta
14      ("eric", "renang"),
15      ("ann", "sepakbola"), # tambah fakta
16      ("ann", "basket")) # tambah fakta
17
18 # listing program 2.2
19 x = var()
20 tom_hobbies = run(0, x, suka("tom", x))
21 for hobby in tom_hobbies:
22     fact(suka, ("bill", hobby))
23 bill_hobbies = run(0, x, suka("bill", x))
24 mary_hobbies = run(0, x, suka("mary", x))
25 for hobby in mary_hobbies:
26     fact(suka, ("ann", hobby))
27 ann_hobbies = run(0, x, suka("ann", x))
28
29 # Query 1
30 ellen_hobbies = run(0, x, suka("ellen", x))
31 tom_hobbies = run(0, x, suka("tom", x))
32 print("ellen:", ellen_hobbies)
33 print("tom:", tom_hobbies)
34 q1 = run(0, x, membro(x, ellen_hobbies), membro(x, tom_hobbies))
35 print("Hobi Ellen dan Tom yang sama :", q1)
36
37 # Query 2
38 mary_hobbies = run(0, x, suka("mary", x))
39 ann_hobbies = run(0, x, suka("ann", x))
40 print("mary:", mary_hobbies)
41 print("ann:", ann_hobbies)
42 q2 = run(0, x, membro(x, mary_hobbies), membro(x, ann_hobbies))
43 print("Hobi Mary dan Ann yang sama :", q2)
```

3. Lakukan langkah praktikum 8

- a. Jalankan program tersebut dengan menambahkan goal sebagai berikut: ukuran(z, "besar").

Tulis ke dalam program dan tampilkan keluaran program warna(z, "cokelat").

Tulis ke dalam program dan tampilkan keluaran program. Tambahkan kode ke dalam program untuk menampilkan binatang yang berukuran besar dan berwarna coklat.

```

1 from kanren.facts import Relation, facts, fact
2 from kanren.core import var, run
3 from kanren.goals import membro
4 from kanren import vars
5
6 ukuran = Relation()
7 warna = Relation()
8 gelap = Relation()
9
10 facts(ukuran, ("beruang", "besar"),
11        ("gajah", "besar"),
12        ("kucing", "kecil"))
13 facts(warna, ("beruang", "cokelat"),
14        ("kucing", "hitam"),
15        ("gajah", "kelabu"))
16
17 fact(gelap, "hitam")
18 fact(gelap, "cokelat")
19
20 x = var()
21 kecil = run(0, x, ukuran(x, "kecil"))
22 print("hewan berukuran kecil: ", kecil)
23
24 besar = run(0, x, ukuran(x, "besar"))
25 print("hewan berukuran besar: ", besar)
26
27 coklat = run(0, x, warna(x, "cokelat"))
28 print("hewan berwarna coklat: ", coklat)
29
30 besar_cokelat = run(0, x, membro(x, besar), membro(x, coklat))
31 print("hewan berukuran besar dan berwarna coklat: ", besar_cokelat)

```

```

PS C:\Coolyeh\Semester 4\KCB\Prak KCB> python -u "c:\Coolyeh\Semester 4\KCB\Prak KCB\Pertemuan2\praktikum02_3.py"
hewan berukuran kecil: ('kucing',)
hewan berukuran besar: ('gajah', 'beruang')
hewan berwarna coklat: ('beruang',)
hewan berukuran besar dan berwarna coklat: ('beruang',)
PS C:\Coolyeh\Semester 4\KCB\Prak KCB>

```

- b. Tambahkan kode ke dalam program untuk menampilkan binatang yang: berwarna gelap, berukuran besar dan berwarna gelap

```

10 facts(ukuran, ("beruang", "besar"),
11        ("gajah", "besar"),
12        ("kucing", "kecil"))
13 facts(warna, ("beruang", "cokelat"),
14        ("kucing", "hitam"),
15        ("gajah", "kelabu"))
16
17 fact(gelap, "hitam")
18 fact(gelap, "cokelat")
19
20 x = var()
21 kecil = run(0, x, ukuran(x, "kecil"))
22 print("hewan berukuran kecil: ", kecil)
23
24 besar = run(0, x, ukuran(x, "besar"))
25 print("hewan berukuran besar: ", besar)
26
27 coklat = run(0, x, warna(x, "cokelat"))
28 print("hewan berwarna coklat: ", coklat)
29
30 besar_cokelat = run(0, x, membro(x, besar), membro(x, coklat))
31 print("hewan berukuran besar dan berwarna coklat: ", besar_cokelat)
32
33 warna_gelap = run(0, x, gelap(x))
34 print("warna gelap: ", warna_gelap)
35 hewan_gelap = []
36 for i in warna_gelap:
37     temp = run(0, x, warna(x, i))
38     temp = [x for x in temp]
39     hewan_gelap += temp
40 print("hewan berwarna gelap: ", tuple(hewan_gelap))
41
42 hewan_gelap_dan_besar = []
43 for i in warna_gelap:
44     temp = run(0, x, warna(x, i), ukuran(x, "besar"))
45     temp = [x for x in temp]
46     hewan_gelap_dan_besar += temp
47 print("hewan berukuran besar dan berwarna gelap: ", tuple(hewan_gelap_dan_besar))

```

```

PS C:\Coolyeh\Semester 4\KCB\Prak KCB> python -u "c:\Coolyeh\Semester 4\KCB\Prak KCB\Pertemuan2\praktikum02_3.py"
hewan berukuran kecil: ('kucing',)
hewan berukuran besar: ('gajah', 'beruang')
hewan berwarna coklat: ('beruang',)
hewan berukuran besar dan berwarna coklat: ('beruang',)
warna gelap: ('cokelat', 'hitam')
hewan berwarna gelap: ('beruang', 'kucing')
hewan berukuran besar dan berwarna gelap: ('beruang',)
PS C:\Coolyeh\Semester 4\KCB\Prak KCB>

```

- c. Setelah mencoba query tersebut, cobalah untuk menambahkan fakta dan relasi baru pada program tersebut. Tambahkan relasi jenis dan fakta jenis("beruang", "karnivora") dan jenis("kucing", "karnivora"). Tambahkan kode ke dalam program untuk menampilkan binatang berjenis karnivora.

```
File Edit Selection View Go Run Terminal Help
praktikum02_3.py - Prak KCB - Visual Studio Code

praktikum02_1.py  praktikum02_2.py M  praktikum02_3.py M X
Pertemuan02 > praktikum02_3.py > ...
1 from kanren.facts import Relation, facts, fact
2 from kanren.core import var, run
3 from kanren.goals import membro
4 from kanren import vars
5
6 ukuran = Relation()
7 warna = Relation()
8 gelap = Relation()
9 jenis = Relation()
10
11 facts(ukuran, ("beruang", "besar"),
12       ("gajah", "besar"),
13       ("kucing", "kecil"))
14 facts(warna, ("beruang", "cokelat"),
15       ("kucing", "hitam"),
16       ("gajah", "kelabu"))
17 facts(jenis, ("beruang", "karnivora"),
18       ("kucing", "karnivora"))
19
20 fact(gelap, "hitam")
21 fact(gelap, "cokelat")
22
23 x = var()
24
25 kecil = run(0, x, ukuran(x, "kecil"))
26 print("hewan berukuran kecil: ", kecil)
27
28 besar = run(0, x, ukuran(x, "besar"))
29 print("hewan berukuran besar: ", besar)
30
31 cokelat = run(0, x, warna(x, "cokelat"))
32 print("hewan berwarna cokelat: ", cokelat)
33
34 besar_cokelat = run(0, x, membro(x, besar), membro(x, cokelat))
35 print("hewan berukuran besar dan berwarna cokelat: ", besar_cokelat)
36
```

```
File Edit Selection View Go Run Terminal Help
praktikum02_3.py - Prak KCB - Visual Studio Code

praktikum02_1.py  praktikum02_2.py M  praktikum02_3.py M X
Pertemuan02 > praktikum02_3.py > ...
21 fact(gelap, "cokelat")
22
23 x = var()
24
25 kecil = run(0, x, ukuran(x, "kecil"))
26 print("hewan berukuran kecil: ", kecil)
27
28 besar = run(0, x, ukuran(x, "besar"))
29 print("hewan berukuran besar: ", besar)
30
31 cokelat = run(0, x, warna(x, "cokelat"))
32 print("hewan berwarna cokelat: ", cokelat)
33
34 besar_cokelat = run(0, x, membro(x, besar), membro(x, cokelat))
35 print("hewan berukuran besar dan berwarna cokelat: ", besar_cokelat)
36
37 warna_gelap = run(0, x, gelap(x))
38 print("warna gelap: ", warna_gelap)
39 hewan_gelap = []
40 for i in warna_gelap:
41     temp = run(0, x, warna(x, i))
42     temp = [x for x in temp]
43     hewan_gelap += temp
44 print("hewan berwarna gelap: ", tuple(hewan_gelap))
45
46 hewan_gelap_dan_besar = []
47 for i in warna_gelap:
48     temp = run(0, x, warna(x, i), ukuran(x, "besar"))
49     temp = [x for x in temp]
50     hewan_gelap_dan_besar += temp
51 print("hewan berukuran besar dan berwarna gelap: ", tuple(hewan_gelap_dan_besar))
52 hewan_karnivora = run(0, x, jenis(x, "karnivora"))
53 print("hewan karnivora: ", hewan_karnivora)
```

PROBLEMS OUTPUT TERMINAL

```
PS C:\Coolyeah\Semester 4\KCB\Prak KCB>
Python 3.7.0 64-bit
55%
```

```
PS C:\Coolyeah\Semester 4\KCB\Prak KCB> python -u "C:\Coolyeah\Semester 4\KCB\Prak KCB\Pertemuan02\praktikum02_3.py"
hewan berukuran kecil: ('kucing',)
hewan berukuran besar: ('gajah', 'beruang')
hewan berwarna cokelat: ('beruang',)
hewan berukuran besar dan berwarna cokelat: ('beruang',)
warna gelap: ('cokelat', 'hitam')
hewan berwarna gelap: ('beruang', 'kucing')
hewan berukuran besar dan berwarna gelap: ('beruang',)
hewan karnivora: ('beruang', 'kucing')
PS C:\Coolyeah\Semester 4\KCB\Prak KCB>
```