

UCT31021 – PRACTICAL FOR ARTIFICIAL INTELLIGENCE
DEPARTMENT OF ICT
FACULTY OF TECHNOLOGY

SOUTH EASTERN UNIVERSITY OF SRILANKA

Labsheet: 01

Date: 10.07.2024

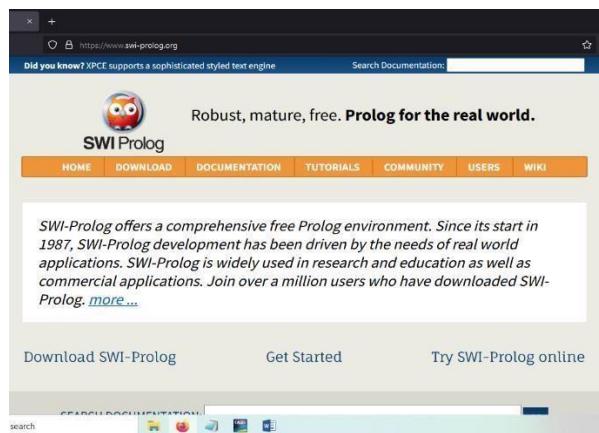
Title : Introduction to PROLOG

Aims :

- To introduce main components in logic Programming
- To get familiar with Data objects.
- Read user input.

Task 01: Download setup file and installation.

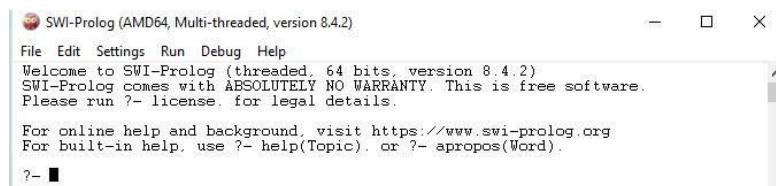
1. Visit the official website - <https://www.swi-prolog.org/>



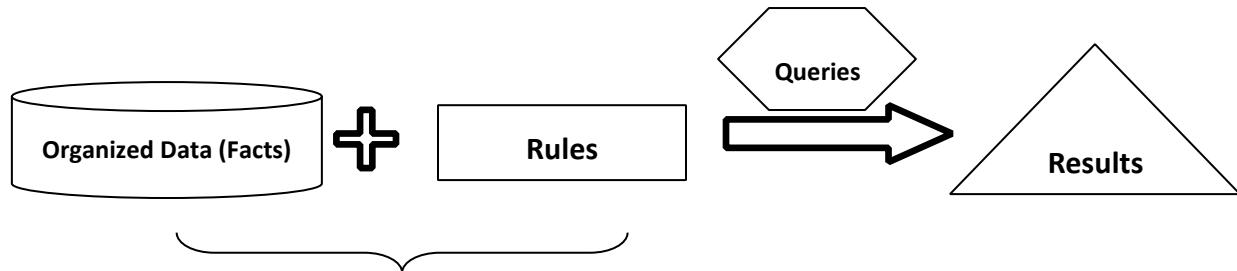
2. Modify the system path by adding swipl location.



3. Prolog console



Introduction:



Knowledge Base / Clauses Example:

Fact	Rules	Query
Apple is a fruit	X is eatable if it is a fruit.	Is apple a fruit?
Tom is a cat	Tom is hungry if he is searching for food.	Is tom a cat?
Lilli is happy	Lilli is happy if she is dance.	Is lilli happy?

```
example.pl
File Edit Browse Compile Prolog Pce Help
example.pl
fruit(apple).
cat(tom).
happy(lily).


```

```
SWI-Prolog (AMD64, Multi-threaded, version 9.2.5)
File Edit Settings Run Debug Help
Welcome to SWI-Prolog (threaded, 64 bits, version 9.2.5)
SWI-Prolog comes with ABSOLUTELY NO WARRANTY. This is free software.
Please run ?- license. for legal details.

For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- fruit(apple).
true.
?- cat(tom).
true.
?- happy(lily).
true.
?- 
```

Task 02: Writing on the Console

1. Write a statement to Hello World.

```
?- write("Hello World.").
Hello World.
true.
?- 
```

2. Display your name and address in multiline.

```
?- write("Name:lahiru Buddhika,"),nl,
   | write("Address:Dunakadeniya,"),nl,
   | write("Welipannagahamulla.").
Name:lahiru Buddhika,
Address:Dunakadeniya,
Welipannagahamulla.
true.
?- 
```

3. Identify the currently working directory by “pwd.” Predicate

```
?- pwd.  
% c:/users/lahiru/documents/prolog/  
true.  
?-
```

4. Use “halt.” predicate or Ctrl+d to stop working of the PROLOG console.

```
?- halt .
```

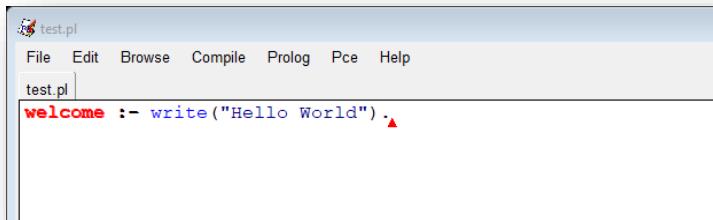
Task 03: Creating Knowledgebase

1. Create a knowledgebase and name it as test.pl in the working directory.

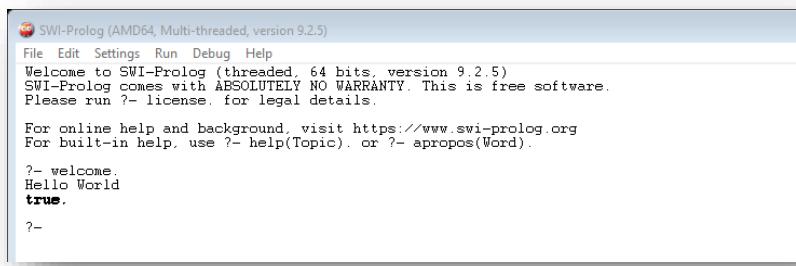
Open the prolog → Click on file → Click on new → Enter the file name as test.pl → Click on open

2. Insert the following code and save it.

```
Welcome :- write('Hello world.').
```



3. Type “welcome.” and observe the outcomes on the consoler.



Task 04: Facts, rules and queries

Some syntax:

if	<code>:</code> -
and	,
or	<code>;</code>
not	<code>not</code>

1. Write down the relationship of given facts and rules.
 - I. John is fat.
 - II. Dog is brown.
 - III. Julian is friend with bob. IV. Elephant is bigger than horse V. Donkey is bigger than dog. VI. Malki likes roja.
 - VII. Everyone likes roja.
 - VIII. John likes everyone.
 - IX. John likes roja or john likes mary. X. John does not like pizza.

The screenshot shows a Prolog IDE window with the title bar "frq.pl [modified]". The menu bar includes File, Edit, Browse, Compile, Prolog, Pce, and Help. The main window displays the following Prolog code:

```
%Facts Representation
fat(John).
brown(Dog).
friend(Julian,Bob).
bigger(Elephant,Horse).
bigger(Donkey,Dog).
likes(Malki,Roja).
likes(Everyone,Roja).
likes(John,Everyone).
dislike(John,Pizza).

%Rule Representation
likes(John,Roja) :- likes(John,Mary).
```

2. Create new knowledgebase file. Add following facts. Load the file into the PROLOG console.

```
fruit(apple). fruit(mango).
```

```
fruit(banana).
```

```
fruit(orange).
```

- I. Save the file and load into the PROLOG consoler.
- II. Check whether apple is a fruit. Use “fruit('apple')”.
- III. Check whether pencil is a fruit.
- IV. Display available fruits which stored in the knowledgebase.

```
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?- fruit(apple).
true.

?- fruit(pencil).
false.

?- fruit(X).
X = apple .

?- fruit(X).
X = apple ;
X = mango ;
X = banana ;
X = orange.

?-

```

To view all fruit type fruit(X) then it will show the first fruit after that press ";" semicolon to view the other fruit as well

Task 05: Data Objects

Data Objects	description	Example
Numbers	Integers and floats value	6, 4.32, -7.91
Atoms	Atoms do not have any numerical value. They can be any names/objects.	jackson, x64_yz, ‘Jackson’
Variable	Start with capital letter and used it to hold a value.	X, Colour, Hi, and_123

1. Create three examples for each data object with different combinations.

```
task3.pl
File Edit Browse Compile Prolog Pce Help
task3.pl
num1(45).
num2(3.5).
num3(-1.2).
atom1(jackson).
atom3('Amal').
variables(X,Colour,Hi123) :- X=apple, Colour=blue , Hi123=123.
```

```
?- variables(X,Colour,Hi123).
X = apple,
Colour = blue,
Hi123 = 123.

?-
```

Task06: Read user input.

1. Use `read(VariableName)`. To read an user input.

Ex: myName

```
write('Enter your name: '),
read(Name),
write(Name).
```

2. Write a rule to request your name and it will welcome you to the Prolog Programming.

Output : Enter your name : XXX

Welcome XXX to Prolog Programming.

```
SWI-Prolog (AMD64, Multi-threaded, version 9.2.5)
File Edit Settings Run Debug Help
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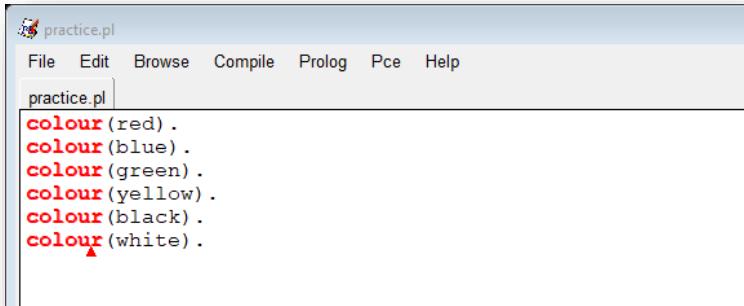
For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- myName.
Enter your Nmae : lahiru
|: .
WelcomelahiruProlog Programming
true.
```

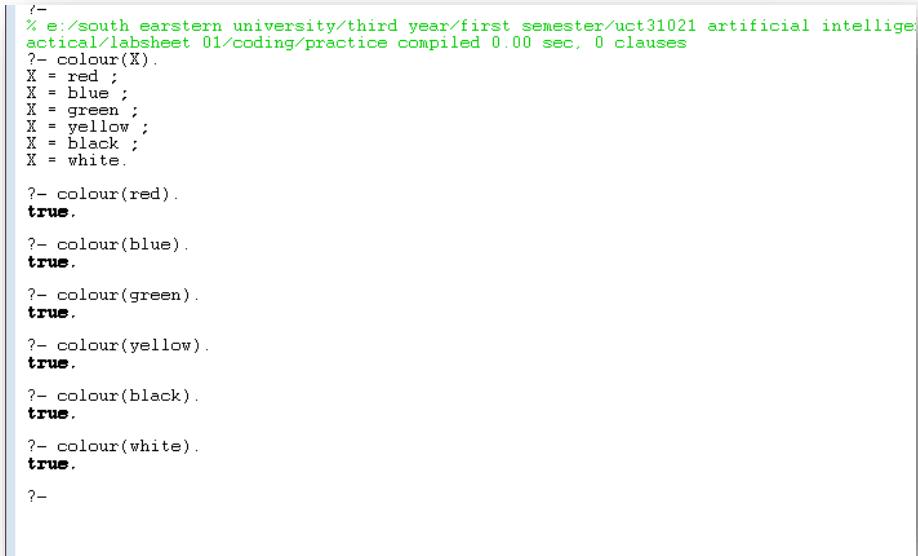
```
task4.pl
File Edit Browse Compile Prolog Pce Help
task4.pl
myName :- write("Enter your Nmae : "),
          read(Name),
          write("Welcome"),
          write(Name),
          write("Prolog Programming").
```

Practice Question:

1. Create new knowledgebase to display and identify 6 colors.



```
practice.pl
File Edit Browse Compile Prolog Pce Help
practice.pl
colour(red).
colour(blue).
colour(green).
colour(yellow).
colour(black).
colour(white).
```



```
'-
% e:/south eastern university/third year/first semester/uct31021 artificial intelligence/lab sheet 01/coding/practice compiled 0.00 sec, 0 clauses
?- colour(X).
X = red ;
X = blue ;
X = green ;
X = yellow ;
X = black ;
X = white.

?- colour(red).
true.

?- colour(blue).
true.

?- colour(green).
true.

?- colour(yellow).
true.

?- colour(black).
true.

?- colour(white).
true.

?-
```

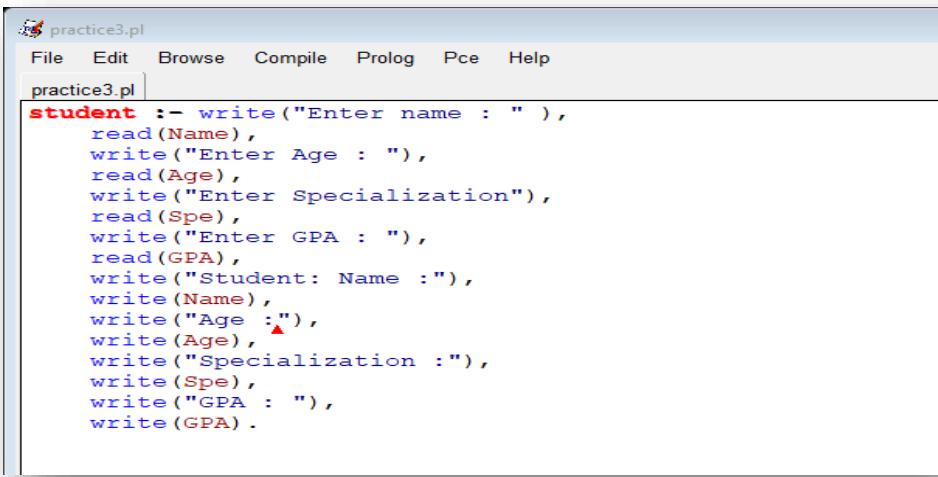
2. Create a knowledge base to store the following details.

Course code	Subject
CIS 11051	Database Design
CIS 21031	Platform Technology
UTC 31021	AI
CIS 41032	Advanced Database

Ex : CIS 11051 is Database Design.

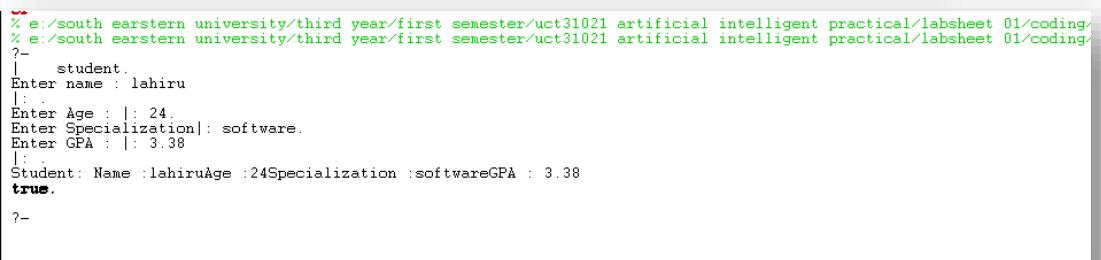
3. Read user input command to display Student data Object and the student can have name, age, specialization and current_GPA.

```
?- student.  
Enter name : 'XXX'.  
Enter Age : |: 20.  
Enter Specialization : |: software.  
Enter GPA: |: 3.82.  
student: Name : XXX, Age: 20, Specialization: software, GPA : 3.82  
true.
```



The screenshot shows a Prolog IDE window titled "practice3.pl". The menu bar includes File, Edit, Browse, Compile, Prolog, Pce, and Help. The code area contains the following Prolog code:

```
student :- write("Enter name : " ),  
          read(Name),  
          write("Enter Age : " ),  
          read(Age),  
          write("Enter Specialization"),  
          read(Spe),  
          write("Enter GPA : " ),  
          read(GPA),  
          write("Student: Name :"),  
          write(Name),  
          write("Age :"),  
          write(Age),  
          write("Specialization :"),  
          write(Spe),  
          write("GPA : " ),  
          write(GPA).
```



The screenshot shows a terminal window with the following output:

```
% e:/south earstern university/third year/first semester/uct31021 artificial intelligent practical/labsheet 01/coding/  
% e:/south earstern university/third year/first semester/uct31021 artificial intelligent practical/labsheet 01/coding/  
?-   
|_ student.  
Enter name : lahiru  
|:  
Enter Age : |: 24.  
Enter Specialization|: software.  
Enter GPA : |: 3.38  
|:  
Student: Name :lahiruAge :24Specialization :softwareGPA : 3.38  
true.  
?-
```