DCIT315 – PRACTICAL I

RUSSELL QUAICOO (10846836), RICHMOND ACHEAMPONG (10854384), ACQUAH KINGSLEY SEGU (10848271), PRISCILLA YAMOAH (10823461), ALBERT ANKOMAH DODOO (10830594), ISRAEL AGO ODAI (10851758), KINGSLEY KUDJORDJIE(10838547)

GROUP 22

The scope of this group work was to choose a problem domain out of six listed problem domains. After settling on the problem domain, we design a expect system in that regard. Which computer to buy was the problem domain we settled on as a group. Per the nature of the problem domain, we settled on decision tree as our intermediate representation.
A decision tree is a management tool that depicts all choice options and outcomes in the form of a flowchart diagram, like a tree with branches and leaves
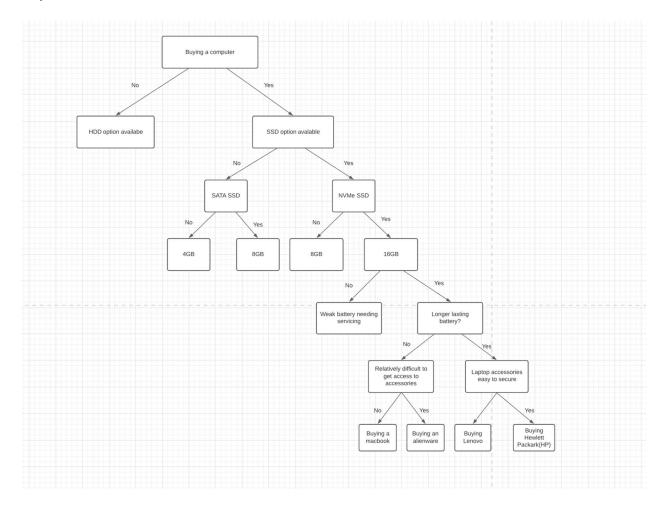
Why we used a decision tree.
Decision tree was used because it is the simplest and most straightforward way to display an algorithm that contains only conditional control statements. With our problem domain, decision tree would allow us to clearly lay out the problem so that all options can be challenged.

How it was implemented.
As a team, we brainstormed and developed a series of questions that are normally asked when an individual wants to purchase a computer. After we were able to come up with all the questions, we found a way to represent all these questions on a decision tree and make an informed decision based on it.

Representation of the decision tree

```
                              ┌──────────────────────┐
                              │   Buying a computer  │
                              └──────────┬───────────┘
                    No                                  Yes
         ┌──────────────────────┐         ┌──────────────────────┐
         │  HDD option availabe │         │  SSD option avalable │
         └──────────────────────┘         └──────────┬───────────┘
                                        No                    Yes
                              ┌──────────────┐      ┌──────────────┐
                              │   SATA SSD   │      │   NVMe SSD   │
                              └──────┬───────┘      └──────┬───────┘
                            No           Yes       No           Yes
                        ┌───────┐   ┌───────┐  ┌───────┐   ┌───────┐
                        │  4GB  │   │  8GB  │  │  8GB  │   │ 16GB  │
                        └───────┘   └───────┘  └───────┘   └───┬───┘
                                                        No           Yes
                                          ┌──────────────────┐  ┌──────────────────┐
                                          │  Weak battery    │  │  Longer lasting  │
                                          │  needing servicing│ │  battery?        │
                                          └──────────────────┘  └────────┬─────────┘
                                                            No                   Yes
                                              ┌──────────────────┐  ┌──────────────────┐
                                              │ Relatively       │  │ Laptop accessories│
                                              │ difficult to get │  │ easy to secure   │
                                              │ access to        │  └────────┬─────────┘
                                              │ accessories      │
                                              └────────┬─────────┘
                                            No              Yes          Yes
                                    ┌──────────┐  ┌──────────┐  ┌──────────┐  ┌──────────┐
                                    │ Buying a │  │ Buying an│  │ Buying   │  │ Buying   │
                                    │ macbook  │  │ alienware│  │ Lenovo   │  │ Hewlett  │
                                    └──────────┘  └──────────┘  └──────────┘  │ Packark  │
                                                                              │ (HP)     │
                                                                              └──────────┘
```
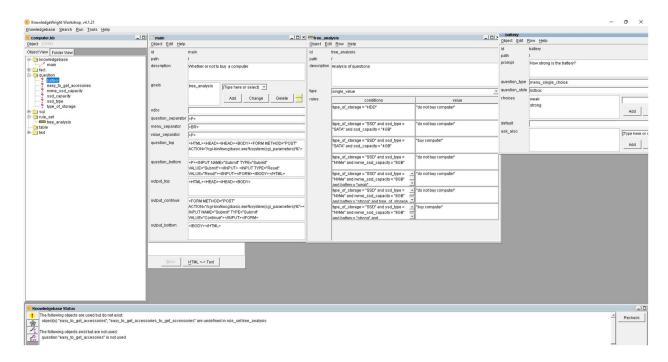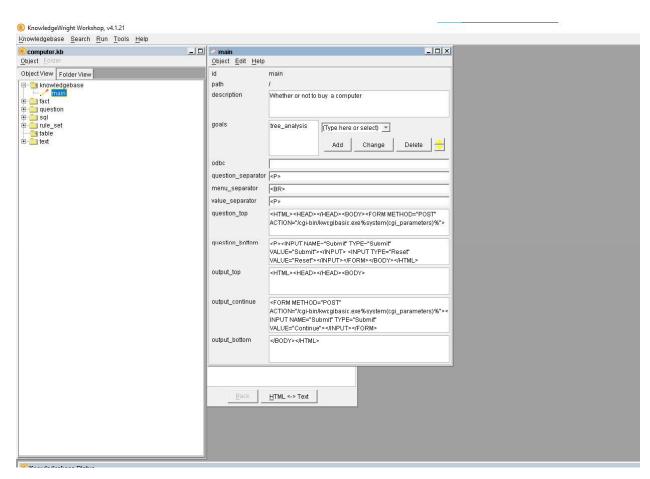
Creating the expert system
Several questions were generated from the intermediate system we used (decision tree). Those questions were inputted into the expert system with a set of decisions. A rule set was then created with combinations of all the decisions that will enable users to decide whether to purchase a computer.
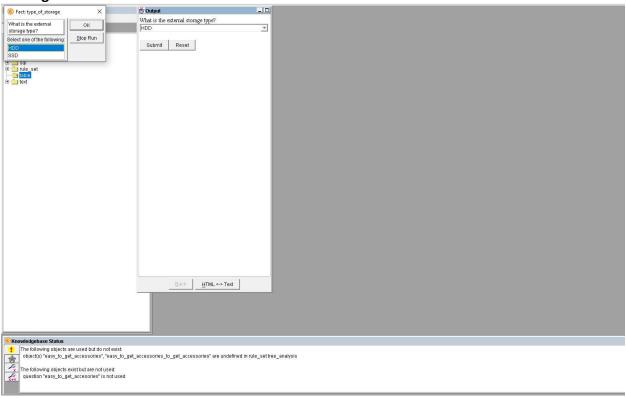The rule set was added as a goal to the knowledgebase so it could be run. The final step we took was to test the knowledgebase.
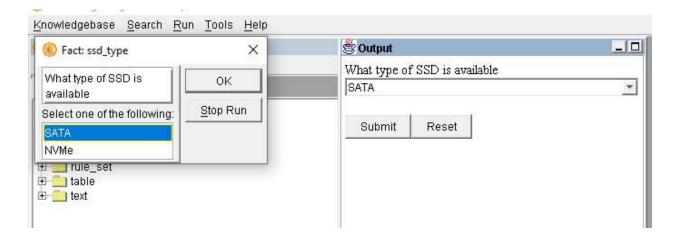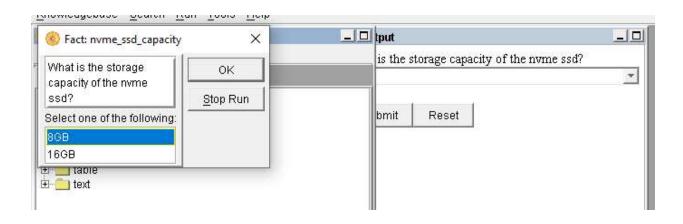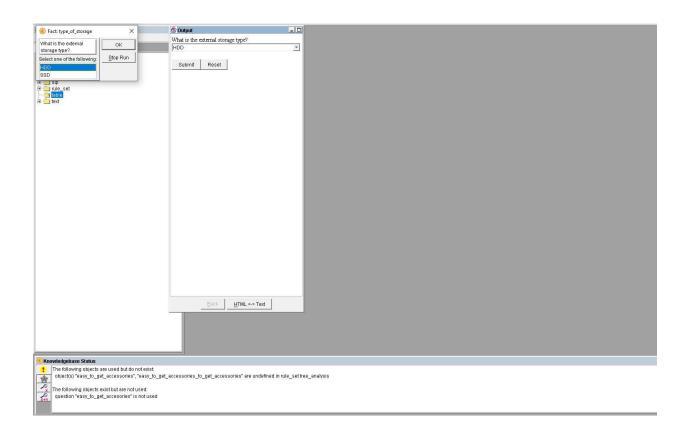
Interface of application

Knowledgebase Search Run Tools Help

computer.kb
Object Folder

Object View Folder View

- knowledgebase
  - main
  - fact
  - question
    - battery
    - easy_to_get_accesories
    - nvme_ssd_capacity
    - ssd_capacity
    - ssd_type
    - type_of_storage
  - sql
  - rule_set
    - tree_analysis
  - table
  - text

main
Object Edit Help

id	main
path	/
description	Whether or not to buy a computer
goals	tree_analysis (Type here or select)
	Add Change Delete
odbc	
question_separator	<P>
menu_separator	
value_separator	<P>
question_top	<HTML><HEAD></HEAD><BODY><FORM METHOD="POST" ACTION="/cgi-bin/kwcgibasic.exe%system(cgi_parameters)%">
question_bottom	<P><INPUT NAME="Submit" TYPE="Submit" VALUE="Submit"></INPUT> <INPUT TYPE="Reset" VALUE="Reset"></INPUT></FORM></BODY></HTML>
output_top	<HTML><HEAD></HEAD><BODY>
output_continue	<FORM METHOD="POST" ACTION="/cgi-bin/kwcgibasic.exe%system(cgi_parameters)%"><INPUT NAME="Submit" TYPE="Submit" VALUE="Continue"></INPUT></FORM>
output_bottom	</BODY></HTML>

Back   HTML <-> Text

tree_analysis
Object Edit Row Help

id	tree_analysis
path	/
description	Analysis of questions
type	single_value

rules	conditions	value
	type_of_storage = "HDD"	"do not buy computer"
	type_of_storage = "SSD" and ssd_type = "SATA" and ssd_capacity = "4GB"	"do not buy computer"
	type_of_storage = "SSD" and ssd_type = "SATA" and ssd_capacity = "4GB"	"buy computer"
	type_of_storage = "SSD" and nvme_ssd_capacity = "8GB"	"do not buy computer"
	type_of_storage = "SSD" and nvme_ssd_capacity = "8GB" and battery = "weak"	"do not buy computer"
	type_of_storage = "SSD" and nvme_ssd_capacity = "8GB" and battery = "strong" and type_of_storage	"do not buy computer"
	type_of_storage = "SSD" and nvme_ssd_capacity = "8GB" and battery = "strong" and	"buy computer"

battery
Object Edit Row Help

id	battery
path	/
prompt	How strong is the battery?
question_type	menu_single_choice
question_style	listbox
choices	weak
	strong
	Add
default	
ask_also	(Type here or s...)
	Add

Knowledgebase Status

The following objects are used but do not exist:
object(s) "easy_to_get_accessories", "easy_to_get_accessories_to_get_accessories" are undefined in rule_set tree_analysis

The following objects exist but are not used:
question "easy_to_get_accesories" is not used

Recheck

Testing interfaces

Fact: nvme_ssd_capacity   ✕

What is the storage capacity of the nvme ssd?

OK

Stop Run

Select one of the following:

8GB

16GB

table

text

_ □ tput   _ □

is the storage capacity of the nvme ssd? ▼

bmit   Reset

Fact: type_of_storage   ✕

What is the external storage type?

OK

Stop Run

Select one of the following:

HDD

SSD

sql

rule_set

table

text

Output   _ □

What is the external storage type?

HDD   ▼

Submit   Reset

Back   HTML <-> Text

Knowledgebase Status

The following objects are used but do not exist:
object(s) "easy_to_get_accessories", "easy_to_get_accessories_to_get_accessories" are undefined in rule_set tree_analysis

The following objects exist but are not used:
question "easy_to_get_accesories" is not used

KnowledgeWright Workshop, v4.1.21

Running computer.kb

Goals: []
Known:
 ssd_type = NVMe
 type_of_storage = SSD
 nvme_ssd_capacity = 8GB
 tree_analysis = do not buy computer