Name:

LumiNUS Account:

Email:

NRIC / Passport / NUS Matriculation No.:
(Choose and provide one applicable)

Institute of Systems Science
National University of Singapore

GRADUATE CERTIFICATE
INTELLIGENT REASONING SYSTEMS

Assessment

Subject: *Machine Reasoning*

SECTION B

Question	Mark
2	**/1.0**
3	**/1.0**
TOTAL	**/2.0**

Instructions for Paper

Duration: Five minutes reading
Duration: Sixty minutes exam

This is an *OPEN BOOK* examination. This examination paper consists of *one* Section and *two* Questions. You are to answer *ALL* questions. There are a total of *2.0 Marks* for this paper.

1. The first **5** minutes are for reading and understanding the questions in this examination paper. You must **NOT** answer any questions using any writing instrument during this time.
2. Read **ALL** instructions before answering any of the examination questions.
3. Write your Student ID number on the **front page** of this examination paper in the box provided.
4. This is an **Open Book** examination. If you wish, you may use reference materials to answer a question. Reference materials can be *books, manuals, handouts* or *notes*.
5. Answers are to be written **only** in this **examination paper** and any **attachments** provided and will be considered for credit. Answers written in any appendices will **NOT** be marked.
6. Use a pen for writing your answers. Pencil may only be used for drawing diagrams and writing program code.
7. Non-programmable calculators may be used if required. **However, computers of any form (laptops, tablets, smart watches etc.) are not permitted to be brought into the examination hall.**
8. State clearly any assumptions you make in answering any question where you feel the requirement is not sufficiently clear.
9. At the end of the examination:
   a) Hand-in the examination paper for **each** section **separately**, any appendices and attachments.
   b) You are **not** allowed to remove the examination paper, appendices or attachments from the examination hall.

REMEMBER:

- ***This is an OPEN BOOK exam.***
- ***There are a total of 2.0 Marks for this paper.***
- ***You are required to answer ALL questions.***
- ***State clearly any assumptions you make in answering any question where you feel the requirement is not sufficiently clear.***

SECTION B

Question 2 *(Total: 1.0 Mark)*

Relate to your **own** workplace and profession or study experience, **Answer the following questions:**

2.1 How/Where would you apply the learnt in your workplace? (max 200 words)
For example: which specific area to perform more efficiently using those learnt, etc.

(0.5 Mark)

[Answer]

Refer to examples in Machine Reasoning Day 1 Annex <What use cases do our MTech students apply?>

2.2 What **business values** can be derived? (max 200 words)

For example: prepare oneself and the organization to apply what new techniques, etc.

(0.5 Mark)

[Answer]

Refer to examples in Machine Reasoning Day 1 Annex <What use cases do our MTech students apply?>

Question 3 *(Total: 1.0 Mark)*

Analyze HDB BTO house recommendation reasoning system **OR** one of IRS-MR-?? Systems, by referring to artifacts from:

https://github.com/telescopeuser/bto-recommender-system

https://github.com/IRS-MR

1. IRS-MR-2019-01-19-IS1PT-GRP-ai.Orz-MerchantOnboarding
2. IRS-MR-2019-01-19-IS1PT-GRP-GenXWarriors-CarRecommendationSystem
3. IRS-MR-2019-01-19-IS1PT-GRP-HEX-LOH_Disposition_Decision-Making_Process_System
4. IRS-MR-2019-01-19-IS1PT-GRP-X-Men-Online_Order_Management_System
5. IRS-MR-2019-01-19-IS1PT-GRP-MRCard
6. IRS-MR-2019-01-19-IS1PT-GRP-4M1L-CCRS
7. IRS-MR-2019-01-19-IS1PT-GRP-Pepper-DepressionScreeningSystem
8. IRS-MR-2019-01-19-IS1PT-GRP-TheSundayLunactics-Harmony
9. IRS-MR-2019-01-19-IS1PT-GRP-ThroneTeam-IR2S
10. IRS-MR-2019-01-19-IS1PT-GRP-THOR-PSR

After extracting useful information, then reuse or create relevant Knowledge Models, for the purpose of re-designing the original system in the context of KIE suite using suitable components, e.g. process, task, form, rules, decision table, decision tree, rule flow groups, data models, etc.

Answer the following questions:

3.1 Write down your selected system name.

(0 Mark)

[Answer]

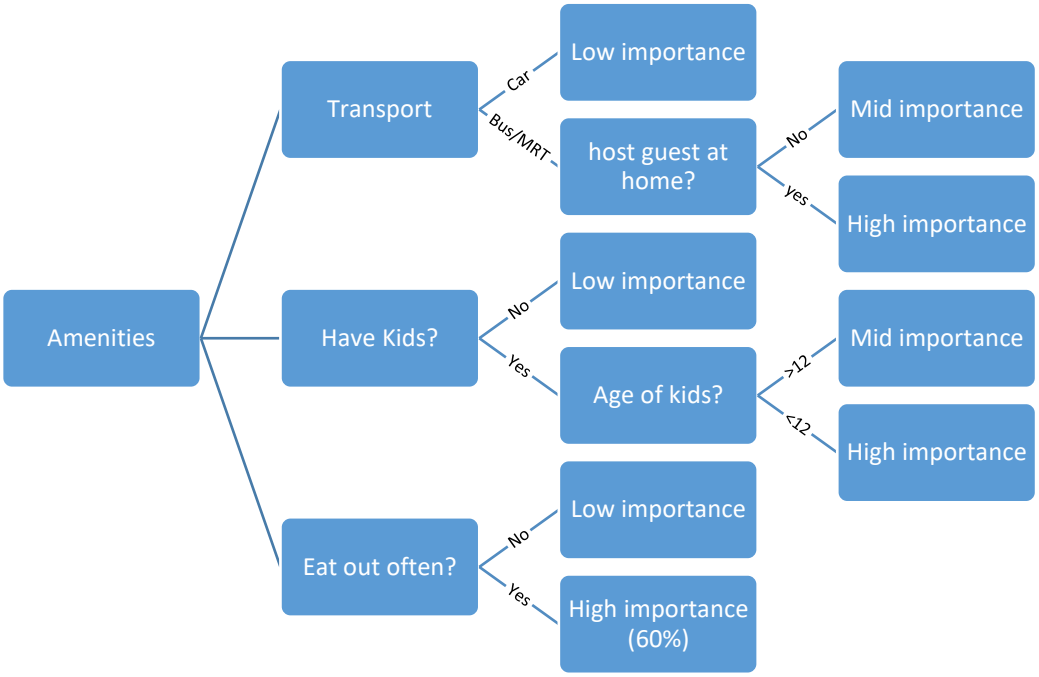
HDB BTO house recommendation reasoning system

3.2 Create/Enhance Rules, or Decision Table, or Decision Tree, e.g. with certainty factors, or additional business rules.

(0.5 Mark)

[Answer]

Below decision tree showcases the importance of amenities to the user in terms of transport, childcare center/schools and shopping malls.



Assume that 60% of people eat out after work based on a survey done by HDB BTO team – we are 60% sure that shopping malls are of high importance in general.

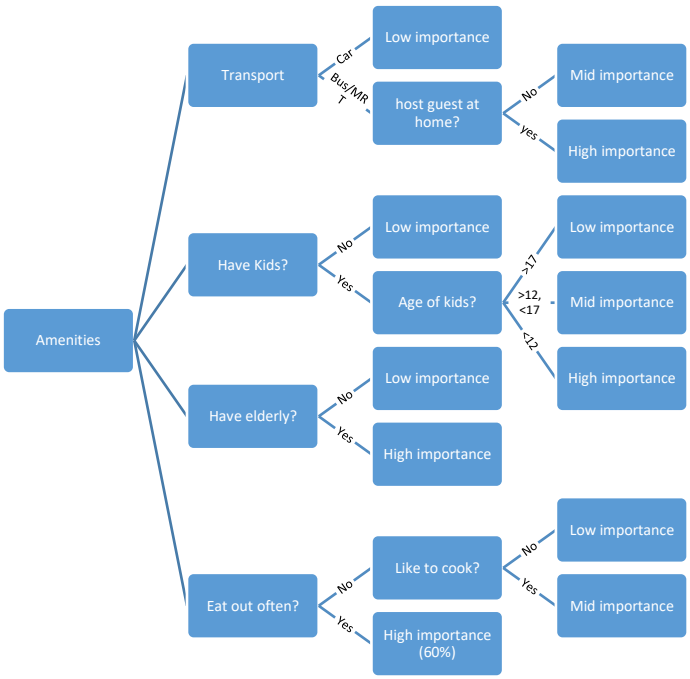
3.3 Re-design/Enhance the original system in the context of KIE suite using suitable components, e.g. process, task, form, rules, decision table, decision tree, rule flow groups, data models, etc.
Hint: Your master design worksheet could be the KIE business process view.
(0.5 Mark)

[Answer]

Decision tree can be further enhanced to include the following scenarios:

1. Age of kids >12 and <17– proximity to secondary schools
2. Elderly – proximity to hospitals/clinics
3. Do not eat out, but love to cook – would require shopping malls (assume that ingredients can be bought in shopping malls) to be nearby

Enhanced decision tree can be found below:



Level of importance can be ranked (less importance, lower the number) to determine which amenities a must-have (high importance) and which are good-to-have (mid to low importance).

Example of enhanced decision tree that can be incorporated into KIE suite via KIE Guided Rules or Decision Table is as below:

Rule No.	**Condition 1**	**Logical Operand**	**Condition 2**	**Sub-goal**
K-1	Do not have kids			School is of low importance (i.e. no preference)
K-2	Have kids	AND	Kids < 12 years old	School is of high importance
K-3	Have kids	AND	Kids > 12 years old and < 17 years old	School is of mid importance
E-1	Do not have elderly staying with them			Hospital/clinic is of low importance (i.e. no preference)
E-2	Have elderly staying with them			Hospital/clinic is of high importance
EO-1	Eat out often			Shopping malls is of high importance (60% of the time)
EO-2	Do not eat out often	AND	Like to cook	Shopping mall is of mid importance
EO-3	Do not eat out often	AND	Do not like to cook	Shopping mall is of low importance (i.e. no preference)

Answer the following questions:

3.1 Write down your selected system name.

(0.1 Mark)

[Answer]

IRS-MR-2019-01-19-IS1PT-GRP-HEX-LOH_Disposition_Decision-Making_Process_System

3.2 Create/Enhance Rules, or Decision Table, or Decision Tree, e.g. with certainty factors, or additional business rules.

(0.4 Mark)

[Answer]

IF LBIN_P_NAME string contains "KEL/TEMP/TEMPERATURE"

THEN assign Y to "Kelvin/Temp"

IF Evaluated Lot is affected

THEN check past 10 Adjacent Lots that is running with same tester

If 10 Adjacent Lots has failed percentage p<0.05

THEN assign Y to "Hardware Commonality"
(categorized into Tester/Handler/LoadBoard/TestProg)

If Evaluated Lot is affected

THEN check 10 Adjacent lots on different test programs

IF 10 Adjacent lots on different test programs has failed percentage p < 0.05

THEN assign Y to "Test Program Commonality"

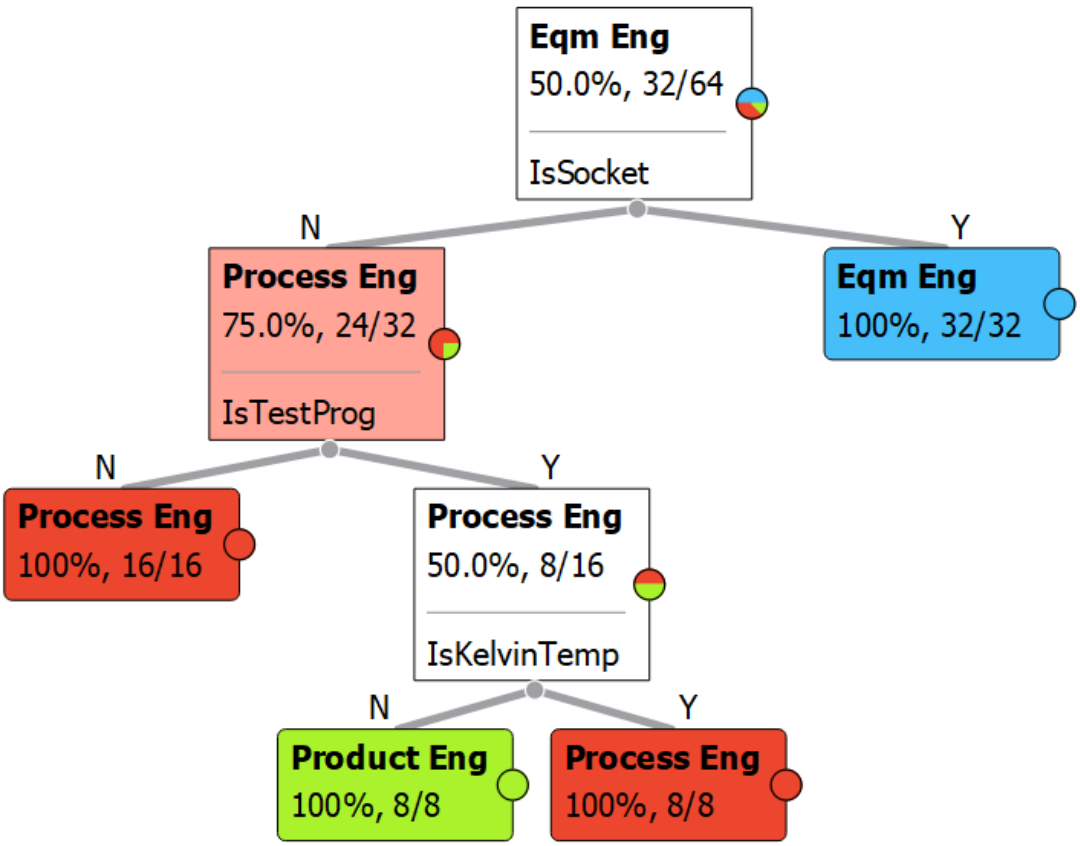
IF Evaluated Lot is affected

THEN check result from other site

IF other site has failed percentage p value <0.05

THEN assign Y to "Site Commonality"

For Assignment to Engineer's function, classification/decision Tree is as follow:

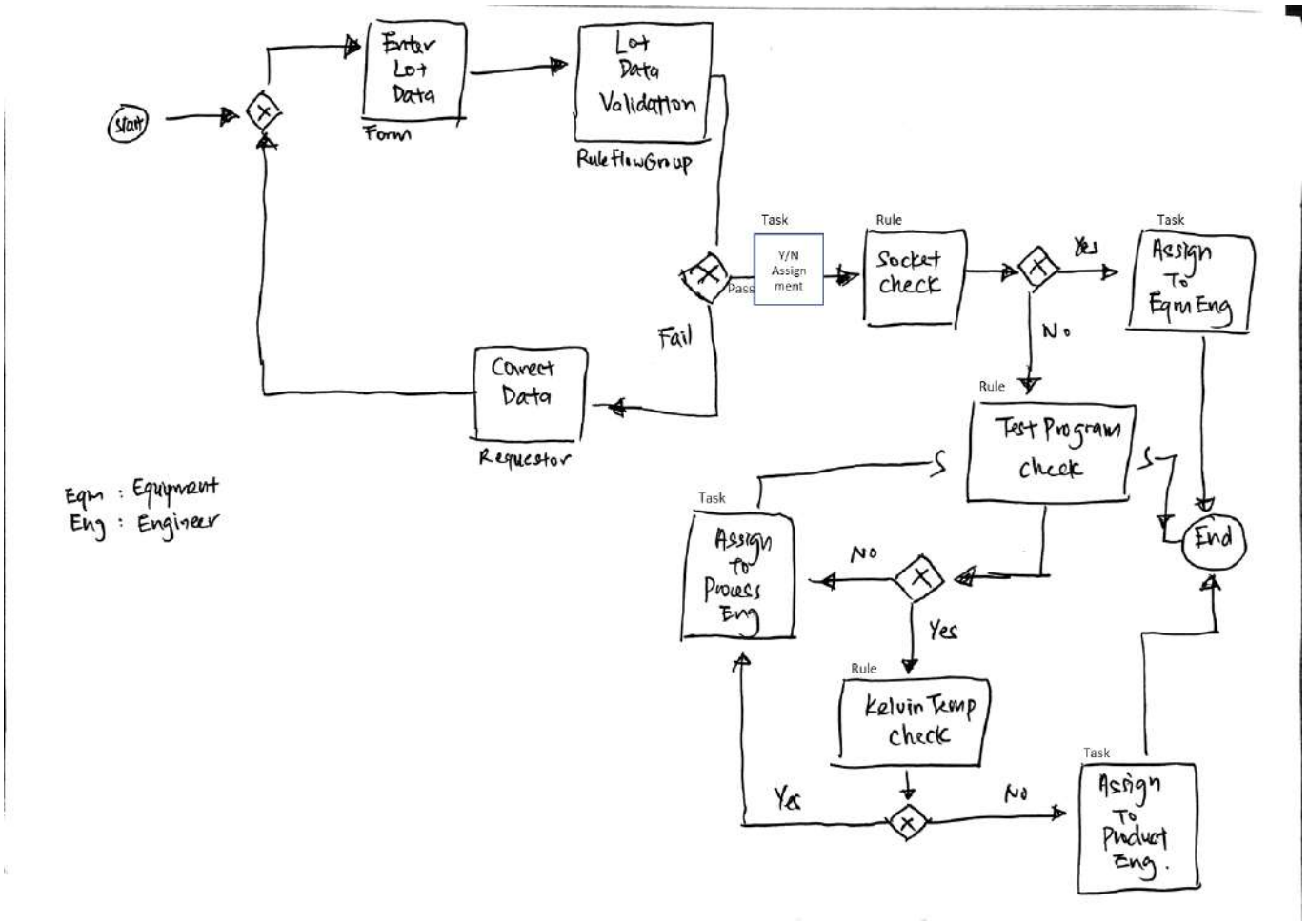

Eqm Eng
50.0%, 32/64
IsSocket
N
Y
Process Eng
75.0%, 24/32
IsTestProg
Eqm Eng
100%, 32/32
N
Y
Process Eng
100%, 16/16
Process Eng
50.0%, 8/16
IsKelvinTemp
N
Y
Product Eng
100%, 8/8
Process Eng
100%, 8/8

3.3 Re-design/Enhance the original system in the context of KIE suite using suitable components, e.g. process, task, form, rules, decision table, decision tree, rule flow groups, data models, etc.

Hint: Your master design worksheet could be the KIE business process view.

(0.5 Mark)

[Answer]



END OF ASSESSMENT PAPER