An Intelligent Board of Security Countermeasure Cases in Prolog.

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Abstract. This report is an approach in defining the execution cases of an intelligent board of a security director's countermeasure cases with a reasoner in Prolog.

Keywords. reasoner, intelligent, storyboard, logic, program, symbolic, case.

1 Introduction.

> Dimensions of counterfeiting is a security identification tool to protect your computer with information and help to inform other users of all security measures.

The international dimensions of counterfeiting by duplication, thefting by deletion replacement or insertion replacement, cyberattacking, hacking / cracking on internet / decentralized network is strong gating with incorrect measure, ungaurding on access breach, unlawful entry, uncontrolling access system codes, momenting by passby fights, intern replacement unverifiables and unvalidating information are exploitations that needs to be addressed.

Vulnerability is a weakness in the security system. A threat is blocked by control of vulnerability.

The dimensions above are used to reason about counter measures in security system. A control is a protective measure used as an action, procedure or technique. Simply, this security measure research report is addressing the following:

- Creation of security controls in unceiled secret information.
- Laying out risk of unceiled secret information and ways of dealing with it.
- Certain on ways of document process - sing with digitized image water- marking.

- Middle aging of counterfeiting by duplication with deletion replacement and insertion replacement.
- A decentralized network with marginal error on control printing with water marking process.
- A counterattack measure in validating and verification of authentic document.

If it is possible or necessary watermarking secret Ceil should be used to prevent ruining access control. Then it should be used.

The security measures are again used in the cases of reasoning. If counterfeiting by duplication creates a methods of recovery in risky information. Then, it should be recover after incident.
If a security officer or engineer can address duplication copy in cases an attacker deletes and insert a counterfeit copy to be used by the document marker thereby making information lose confidentiality or integrity. Then, it should be engineered for counter measuring. If in a decentralized scenario, the document marker will be able to authenticate as usual to able to have access to the digital document to make a copy for further processing. Then, it should create authenticated access. If the technique of authentication and authorization can be by password or biometry (fingers, iris, height etc). Then it should create technology for culturing and socializing the security process of characterization.
If file transfer protocol gives the decentralized manner of network access with secure means. Then it should create confidentiality and availability in the security process. If Unceil secret paper creates vulnerabilities and embarrassment in ruining the authenticity of document. Then it should leave the security room of vulnerabilities. If security agents unchase theft document in a vulnerable situation. Then it should be way to dismissal from the work place.
If it is hard and difficult to physically timestamp all documents at a security site. Then watermarking by stamping should be the way to countermeasure. If vulnerabilities prevention is a means to countermeasure a counterfeit information.

Then finally a Ceil by watermarking should be used.

2 Director Assessment.

A security director or officer or engineer addressing duplication copy in cases an attacker deletes and insert a counterfeit copy to be used by the document marker thereby making information lose confidentiality or integrity.

In the middle ages of counterfeiting by duplication, a copy of existing image is kept with the security officer or engineer on deletion replacement or insertion replacement. In the castle of counterfeiting by duplication, a different but approved image is quickly inserted into the document processing of the watermarking paper. Then it is casted into decentralized networks with a marginal error on the previous information dissemination from the control printer software. The fortress of counterfeiting by duplication a security officer will counterattack with an invalid document fight in the sense of seizing and requesting a reprint of information to process new.

In previous work[4], a Director will initiate the main rule of the xProlog application which is coded as below:

```
main :-
 1.   nl,
 2.   write('Security Director Program.'), nl,
 3.   write('>   Enter a selection followed by a period.'), nl,
 4.    write('>   1. Yes, countermeasure'), nl,
 5.  write('>   2. Exit'), nl, nl,
 6.   read(Choice),
 7.  assess_opt(Choice),
 8.  main.

initialization('main').
```

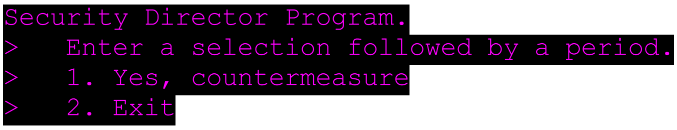
It will first move the cursor to a newline, coded as blue. It will display a text "Security Director Program" on the monitor, coded on line 2 and a newline is called. A selection is read to be assessed with the assess_opt rule of the program on line 7. The assessment is a forward chain of cdd abbreviation rules, count of 12. After each rule has successfully run then the next cdd rule and final cdd then runs the main rule again. This is how the security director works. It identifies each Vulnerability and ask you to counter messure until all assessments are done at the office. This new director uses a case-based approach to inform the director of routine checks to be made. This case-based approach uses a main rule as shown below:

```
main :-
   nl,
   tab(4),write('Security Cases Reasoner.'), nl,
   tab(2),write('Developed by: Frank Appiah'),nl,nl,
   write('>   Enter a selection followed by a period.'), nl,
   write('>   1. Thefting Case'), nl,
   write('>   2. Insertion Replacement Case'),nl,
   write('>   3. Cyberattack Case'), nl,
   write('>   4. Hacking-Crack Case'), nl,
   write('>   5. Strong Gating Case'), nl,
   write('>   6. Access Breach Case'), nl,
   write('>   7. Unlawful Entry Case'), nl,
   write('>   8. Uncontrolled System Codes     Case'), nl,
   write('>   9. Passby Fight Case'), nl,
   write('>  10. Intern Replacement Case'), nl,
   write('>  11. Invalid Information Case'), nl,
   write('>  12. Exit'), nl, nl,
   read(Choice),
   cdd(Choice), main.
  initialization('main').
```

The main is initialized just like the other counterpart. It then writes to display about about 14 messages of instruction and a selection menu. The call instructions are each separated by a comma. The read instructions is a system call by the logic program. It allows input to be read into the running task. The case based approach is implemented with cdd(N) head rule where N is the number of case rules to execute or run. Here, there are about 12 of such rules. Same rule name is used but the passing head value is an increment of 1. The following are the cdd head rules:

- cdd(1),
- cdd(2),
- cdd(3),
- ….
- cdd(12).

An execution of the cdd head will in turn run the main in a loop. This is an interpreter application kind of evaluate return to loop program. The cdd(12) rule is a quit body in the application. A successful execution run did show the following in the previous program:



```
Security Director Program.
>    Enter a selection followed by a period.
>    1. Yes, countermeasure
>    2. Exit
```

This now shows as this:

```
   Security Cases Reasoner.
 Developed by: Frank Appiah
>   Enter a selection followed by a period.
>   1. Thefting Case
>   2. Insertion Replacement Case
>   3. Cyberattack Case
>   4. Hacking-Crack Case
>   5. Strong Gating Case
>   6. Access Breach Case
>   7. Unlawful Entry Case
>   8. Uncontrolled System Codes Case
>   9. Passby Fight Case
>  10. Intern Replacement Case
>  11. Invalid Information Case
>  12. Exit
```

Code: [Security Case Reasoner]

```
cdd(1) :-
   nl,
   write('Identify thefting by deletion replacement.'), nl,
   write('>   Yes, countermeasure on thefting by deletion'), nl.
```

Code: [Security Director [4]- Prolog Code in Appendix 1].

```
cddtheft(1) :-
   nl,
   write('Identify thefting by deletion replacement.'), nl,
   write('>   Enter a selection followed by a period.'), nl,
   write('>   1. Yes, countermeasure on thefting by deletion'), nl,
   write('>   2. Exit'), nl, nl,
   read(Choice),
   cddrep(Choice),
   main(Choice).
```

The head rule cdd(1) is the new used to achieve the same information as cddtheft head rule. This prolog application is a mobile application that a security officer or engineer can use to run security routine with a team in countermeasure strategies. The logic program is programmed in XProlog Android on Honor model from Huawei corporation. The benchmark set from AI Expert on this device is shown in Appendix 3.

Conclusion.

This report has provided a case based approach in programming an intelligent board of directors security countermeasure in logic programming, Prolog. This is original in reasoning on information security measures as if-then reasoning cases. System design of Security Case Reasoner is in terms of source code(input) of the logic program and run outputs that are shown in this report. The contrast between these two logic programs is essential in computing itself.

Further Reading

[1] Frank Appiah (2020). Security Controls or Countermeasures: Vunerabilities Prevention, Easychair Preprint 4410.
[2] XProlog (2020). XProlog Android Package, Playstore. Programming IDE. Online Accessed.
[3] Android Mobile (2020). Huawei Device Honor Model. Programming with Footprint Minicomputers. Huawei Corporation.
[4] Frank Appiah (2020). An Intelligent Board of Storytelling of Castle of Fortress in Prolog. Easychair Preprint. Unpublished.

Appendix 1.

Prolog Code.

```
cdd(1) :-
   nl,
   write('Identify thefting by deletion replacement.'), nl,
   write('>   Yes, countermeasure on thefting by deletion'), nl.


cdd(2) :-
   write('Identify insertion replacement at office.'),nl,
   write('>   Yes, countermeasure on insertion replacement'), nl.


cdd(3) :-
   write('Identify cyberattack on network at office or home.'),nl,
   write('>   Yes, countermeasure on cyberattacking.'), nl.


cdd(4) :- write('Identify hacking /cracking on internet/decentralized network.'),nl,
   write('>   Yes, strong countermeasure on hacking/cracking.'), nl.

cdd(5) :- write('Identify if it is strong  gating with incorrect measure.'),nl,
    write('>    Yes, countermeasure on strong gating.'), nl.


cdd(6) :- write('Identify if ungaurding on access breach.'),nl,
    write('>   Yes, countermeasure by gaurding on access breach.'), nl.


cdd(7) :- write('Identify if there is an unlawful entry.'),nl,
write('>   Yes, countermeasure on unlawful entry.'), nl.


cdd(8) :- write('Identify if it is an uncontrolling access system codes.'),nl,
 write('>   Yes, countermeasure on controlling access system codes.'), nl.


cdd(9) :- write('Momenting by passby fights is recalled.'),nl,
write('>   Yes, countermeasure on passby riot is checked.'), nl.


cdd(10) :-
    write('Identify if it caused by intern replacement unverifiables and unvalidatiables.'),nl,
    write('>   Yes, countermeasure by checking on intern replacement.'), nl.


cdd(11) :-
    write('Identify if it is invalidating information'),nl,
    write('>   1. Yes, countermeasure check on invalid information.'), nl.



%cdd(_) :-
%    write('Unknown operation').

cdd(12) :- write('Quiting...'), halt.

main :-
    nl,
    tab(4),write('Security Cases Reasoner.'), nl,
    tab(2),write('Developed by: Frank Appiah'),nl,nl,
    write('>   Enter a selection followed by a period.'), nl,
    write('>   1. Thefting Case'), nl,
    write('>   2. Insertion Replacement Case'), nl,
    write('>   3. Cyberattack Case'), nl,
    write('>   4. Hacking-Crack Case'), nl,
    write('>   5. Strong Gating Case'), nl,
    write('>   6. Access Breach Case'), nl,
    write('>   7. Unlawful Entry Case'), nl,
    write('>   8. Uncontrolled System Codes Case'), nl,
    write('>   9. Passby Fight Case'), nl,
    write('>  10. Intern Replacement Case'), nl,
    write('>  11. Invalid Information Case'), nl,
    write('>  12. Exit'), nl, nl,
    read(Choice),
    cdd(Choice), main.

initialization('main').
```

Appendix 2: Execution Runs.

```
    Security Cases Reasoner.
  Developed by: Frank Appiah

>   Enter a selection followed by a period.
>   1. Thefting Case
>   2. Insertion Replacement Case
>   3. Cyberattack Case
>   4. Hacking-Crack Case
>   5. Strong Gating Case
>   6. Access Breach Case
>   7. Unlawful Entry Case
>   8. Uncontrolled System Codes Case
>   9. Passby Fight Case
>  10. Intern Replacement Case
>  11. Invalid Information Case
>  12. Exit

1.
Identify thefting by deletion replacement.
>   Yes, countermeasure on thefting by deletion

    Security Cases Reasoner.
  Developed by: Frank Appiah

>   Enter a selection followed by a period.
>   1. Thefting Case
>   2. Insertion Replacement Case
>   3. Cyberattack Case
>   4. Hacking-Crack Case
>   5. Strong Gating Case
>   6. Access Breach Case
>   7. Unlawful Entry Case
>   8. Uncontrolled System Codes Case
>   9. Passby Fight Case
>  10. Intern Replacement Case
>  11. Invalid Information Case
>  12. Exit

2.
Identify insertion replacement at office.
>   Yes, countermeasure on insertion replacement

    Security Cases Reasoner.
  Developed by: Frank Appiah

>   Enter a selection followed by a period.
>   1. Thefting Case
>   2. Insertion Replacement Case
>   3. Cyberattack Case
>   4. Hacking-Crack Case
>   5. Strong Gating Case
>   6. Access Breach Case
>   7. Unlawful Entry Case
>   8. Uncontrolled System Codes Case
>   9. Passby Fight Case
>  10. Intern Replacement Case
>  11. Invalid Information Case
>  12. Exit
```

```
3.
Identify cyberattack on network at office or home.
>   Yes, countermeasure on cyberattacking.
```

```
    Security Cases Reasoner.
  Developed by: Frank Appiah
```

```
>   Enter a selection followed by a period.
>   1. Thefting Case
>   2. Insertion Replacement Case
>   3. Cyberattack Case
>   4. Hacking-Crack Case
>   5. Strong Gating Case
>   6. Access Breach Case
>   7. Unlawful Entry Case
>   8. Uncontrolled System Codes Case
>   9. Passby Fight Case
>  10. Intern Replacement Case
>  11. Invalid Information Case
>  12. Exit
```

```
4.
Identify hacking /cracking on internet/decentralized network.
>   Yes, strong countermeasure on hacking/cracking.
```

```
    Security Cases Reasoner.
  Developed by: Frank Appiah
```

```
>   Enter a selection followed by a period.
>   1. Thefting Case
>   2. Insertion Replacement Case
>   3. Cyberattack Case
>   4. Hacking-Crack Case
>   5. Strong Gating Case
>   6. Access Breach Case
>   7. Unlawful Entry Case
>   8. Uncontrolled System Codes Case
>   9. Passby Fight Case
>  10. Intern Replacement Case
>  11. Invalid Information Case
>  12. Exit
```

```
5.
Identify if it is strong  gating with incorrect measure.
>    Yes, countermeasure on strong gating.
```

```
    Security Cases Reasoner.
  Developed by: Frank Appiah
```

```
>   Enter a selection followed by a period.
>   1. Thefting Case
>   2. Insertion Replacement Case
>   3. Cyberattack Case
>   4. Hacking-Crack Case
>   5. Strong Gating Case
>   6. Access Breach Case
>   7. Unlawful Entry Case
>   8. Uncontrolled System Codes Case
>    9. Passby Fight Case
>   10. Intern Replacement Case
>   11. Invalid Information Case
>   12. Exit
```

```
6.
Identify if ungaurding on access breach.
>    Yes, countermeasure by gaurding on access breach.
```

```
    Security Cases Reasoner.
  Developed by: Frank Appiah
```

```
>    Enter a selection followed by a period.
>    1. Thefting Case
>    2. Insertion Replacement Case
>    3. Cyberattack Case
>    4. Hacking-Crack Case
>    5. Strong Gating Case
>    6. Access Breach Case
>    7. Unlawful Entry Case
>    8. Uncontrolled System Codes Case
>    9. Passby Fight Case
>   10. Intern Replacement Case
>   11. Invalid Information Case
>   12. Exit
```

```
7.
Identify if there is an unlawful entry.
>    Yes, countermeasure on unlawful entry.
```

```
    Security Cases Reasoner.
  Developed by: Frank Appiah
```

```
>    Enter a selection followed by a period.
>    1. Thefting Case
>    2. Insertion Replacement Case
>    3. Cyberattack Case
>    4. Hacking-Crack Case
>    5. Strong Gating Case
>    6. Access Breach Case
>    7. Unlawful Entry Case
>    8. Uncontrolled System Codes Case
>    9. Passby Fight Case
>   10. Intern Replacement Case
>   11. Invalid Information Case
>   12. Exit
```

```
8.
Identify if it is an uncontrolling access system codes.
>    Yes, countermeasure on controlling access system codes.
```

```
    Security Cases Reasoner.
  Developed by: Frank Appiah
```

```
>    Enter a selection followed by a period.
>    1. Thefting Case
>    2. Insertion Replacement Case
>    3. Cyberattack Case
>    4. Hacking-Crack Case
>    5. Strong Gating Case
>    6. Access Breach Case
>    7. Unlawful Entry Case
>    8. Uncontrolled System Codes Case
>    9. Passby Fight Case
>   10. Intern Replacement Case
>   11. Invalid Information Case
>   12. Exit

9.
Momenting by passby fights is recalled.
>    Yes, countermeasure on passby riot is checked.

    Security Cases Reasoner.
  Developed by: Frank Appiah

>    Enter a selection followed by a period.
>    1. Thefting Case
>    2. Insertion Replacement Case
>    3. Cyberattack Case
>    4. Hacking-Crack Case
>    5. Strong Gating Case
>    6. Access Breach Case
>    7. Unlawful Entry Case
>    8. Uncontrolled System Codes Case
>    9. Passby Fight Case
>   10. Intern Replacement Case
>   11. Invalid Information Case
>   12. Exit

10.
Identify if it caused by intern replacement unverifiables and
unvalidatiables.
>    Yes, countermeasure by checking on intern replacement.

    Security Cases Reasoner.
  Developed by: Frank Appiah

>    Enter a selection followed by a period.
>    1. Thefting Case
>    2. Insertion Replacement Case
>    3. Cyberattack Case
>    4. Hacking-Crack Case
>    5. Strong Gating Case
>    6. Access Breach Case
>    7. Unlawful Entry Case
>    8. Uncontrolled System Codes Case
>    9. Passby Fight Case
>   10. Intern Replacement Case
>   11. Invalid Information Case
>   12. Exit

11…. More.
```

Appendix 3. Benchmark Set from AI Expert Magazine.

Benchmark	**Iterations**	**Average**
tail_call_atom_atom	50,000	6.20
binary_call_atom_atom	50,000	9.60

cons_list	50,000	6.80
walk_list	50,000	5.20
walk_list_rec	50,000	6.60
args(1)	50,000	6.20
args(2)	50,000	8.80
args(4)	50,000	14.80
args(8)	50,000	25.20
args(16)	50,000	46.40
cons_term	50,000	8.40
walk_term	50,000	7.40
walk_term_rec	50,000	7.00
shallow_backtracking	50,000	5.20
deep_backtracking	50,000	17.80
trail_variables	50,000	15.40
medium_unify	50,000	0.80
deep_unify	10,000	1.00
integer_add	10,000	9.00
floating_add	10,000	10.00
arg(1)	50,000	22.80
arg(2)	50,000	23.20
arg(4)	50,000	20.60
arg(8)	50,000	18.40
arg(16)	50,000	18.60
index	20,000	8.50
assert_unit	10,000	98.00
access_unit	10,000	92.00
slow_access_unit	10,000	94.00
setof	10,000	43.00
pair_setof	10,000	67.00
double_setof	10,000	676.00
bagof	10,000	27.00

28,110 msec