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1) 1. Objective: project the assets and liabilities of an insurer after one year such that there is less than 0.5% chance of liabilities exceeding assets

2. Plan the modelling process, make assumptions that can be justified logically

3. collect the data regarding the cashflows from the accounts of the insurance company. (balance sheet).

4. Parameters: Premium collected, no. of policy holders, no. of claims, claim amounts, ~~reserve~~ interest rates, inflation. stock market performance.
Taking parameter values, that are random but the range should be such that result doesn't vary much from real world.

5. The model should be able to correspond to the real world and this can be achieved using the existing worst case scenario.

6. If there is war going on, the interest rates will become higher. If we develope a scenario around this, it could act as another worst case scenario.

As interest rates increase, bond price decrease, hence profitability increases.

Assuming insurance company has invested in bonds.

6. Involve the experts on real world systems Eg:- Turing Test.
One can even avail peer review

7. A simulation package should be appropriate for the implementation of the model. In this way the accuracy of the model and it resemblence with real world can be established.

8. Write a computer program for the model

9. Debug the program

10. Test the reasonableness of the output from the model.
The assets should exceed the liabilities 99.5%

11. Review and carefully consider the appropriateness of the model in light of small changes to the input parameters.

13. analyse the output (whether is desired and logically correct).

14. ~~Ensure the~~ Ensure the relevant professional guidance has been complied with

15 communicate and document the results and the model.

Q.2. Factors that could cause the probability of the insurance company having insufficient assets to honour the payouts under the policies :-

1) Insufficient data
2) The assumptions taken were unreasonable
3) Required parameters weren't considered
4) Interrelationship between parameters wasn't considered
5) The stock market didn't react as desired.

Q.3) The government of a small country has asked you to construct a model for forecasting future ~~mortality~~ mortality. Outline stages in identifying an appropriate model.

→ The objective of the model is to forecast future mortality.
Then we need to use standard ~~de~~ statistical methods.
Stocastic methods have major advantage of producing a forecast probability distribution rather than deterministic point forecast.
Most methods of ~~moto~~ mortality forecasting ~~nat~~ are ~~expo~~ extrapolative and make use of regularity in age patterns and trends over time.
We need to consider parameters such as causes of death, age, health history, any addictive habits, etc.
sex specific mortality rates, derived life tables can also considered.
A major problem for age specific forecasting is high dimensionality which models need to reduce.
considering everything, an appropriate model should be identified.

Q. 4) A clear documentation framework can help manage the model.
The documentation framework should include a full list of documents, the purpose of each document and how different documents link together.

1) The structure of the ~~no~~ documentation ~~w~~
2) A good executive summary can be powerful and transparent way to communicate messages.
3) Justification of the approach towards the model and its assessment.
4) Evaluation of strength and weakness of the model.
5) Review of validation (by peer / experts)
6) consideration of risk
7) Balance sheet, risk coverage report
8) How to run the model.

Q. 5

Advantages

1) Model is simple to understand
2) It is easy
3) It is cheap
   Hence reproducible
4) Data is mostly accurate
5) It can ajust with the future data

Disadvantages

1) Past trends aren't always same as future trends
2) ~~EXCE~~ Extrapolation can't be easy
3) The consumption can be sensitive to various factors.
4) It can be inaccurate

Q. 6) There are various reasons why results are different :

1) The assumptions taken by both the students might be different.
2) The methodology followed by both students might be different.
3) Both of them might be wrong
4) They might have different simulations.
5) Both might have taken different time

Q. 7 The model should be valid and credible
It must be simple to communicate.
It should consider worst case scenarios
It should observe the trend in data.
It should be reproducible.

Q. 8) The ~~do~~ nature of data.
Any previous existing models, their success or failure
Type of model :- stocastic or deterministic
Trends, if any.
simple to understand, communicate
consideration of worst case scenario.