1. Input File: "Default Risk charge holdings.xls".
   Sheet: 'Securitization Holdings' Columns below:
   a) Security-Security id i.e. holding identifier
   b) Long/Short: Signifies Long or Short of position
   c) Pool ID
   d) Bucket: Bucket to which the security belongs
   e) Tranche Type
   f) Attachment Point (%)
   g) Detachment Point (%)
   h) Market Value
   i) Rating
   j) Expected Maturity

   Sheet: SecuritizaRW-LT. Columns below:

   a) Rating: Rating of long term security
   b) Column B and C: Risk weights in %for 1Year and 5 year maturity respectively for senior tranche.
   c) Column D and E: Risk weights in % for 1Year and 5 year maturity respectively for non-senior tranche.

   Sheet: SecuritizaRW-ST. Columns below:

   d) Rating: Rating of short term security
   e) Risk weight: Risk weight in %

2. Calculation of Gross JTD:
   a) Calculate Gross JTD(Long/Short) for each security. Each security will either yield Gross JTD(Long) or Gross JTD(Short)
      i. This is applicable for securities where Long/Short = Long
      Gross JTD(Long) = Market Value
      ii. This is applicable for securities where Long/Short = Short
      Gross JTD(Short) = Market Value
      iii. Calculate year fraction of expected maturity: Determine net maturity for each security based on expected maturity column. Reference date is Today. Today has to be dynamic, i.e., tomorrow's today should be tomorrow's date. So tenure is Expected Maturity-Today. If Tenure is greater than 1 Year then year fraction is simply 1but if it is less than 1 year fraction has to be calculated. For example if tenure is 3 months then Year fraction is 3/12 = 25%. If tenure is 1 or 1.2 then year fraction is 1. If tenure is 9 months then year fraction is 9/12 = 75%

iv. Scale each Gross JTD by year fraction: Multiply Gross JTD by year fraction. This is our final Gross JTD

3. Calculate Net JTD($net\ JTD_{long}$ and $net\ JTD_{short}$) from Gross JTD:
   a) 2 securities having same Asset Class, Bucket, Pool ID, Tranche Type and Rating should aggregate to give rise to $net\ JTD_{long}$ or $net\ JTD_{short}$. More details below.
      i. If 2 Gross JTD for same are (+)ve then they should be simply added to get a net JTD. It will be called $net\ JTD_{long}$
      ii. If 2 Gross JTD for same are (-)ve then they should be simply added to get a net JTD. It will be called $net\ JTD_{short}$
      iii. If 2 Gross JTD have different signs i.e. one (+)ve(Long exposure) and another (-)ve(Short) then also they should be added. The resulting net JTD would be called $net\ JTD_{long}$ if the aggregation is +ve else if -ve then $net\ JTD_{short}$
   b) Other security's Gross JTD should get assigned to Net JTD. No netting, aggregation possible. It will be called $net\ JTD_{long}$ or $net\ JTD_{short}$ depending upon sign.
4. Now we have Net JTDs which are assigned to bucket. Remember a bucket is assigned to each security and common Asset Class, Rating ,Pool ID, Tranche Type for 2 securities can happen in same bucket only.
5. **Calculate Risk weight for each Net JTD.** Remember that Net JTD inherited common rating from securities being netted. For securities that did not get netted , it is straightforward it is simply rating of that security.
   Below steps are required:
   a) Calculate net maturity of security. It is simply Expected Maturity minus Today
   b) Get 1 Year and 5 year maturity weights based on net maturity by linear interpolation. Examples below:
      i. Net maturity < 1 year: 1 Year maturity weight = 100%, 5 Year maturity weight = 0%
      ii. 5 year > Net maturity > 1 year: Linear interpolation based on how close is net maturity to these 2 boundaries. For example for net maturity of 2.5 Years, 1 Year maturity weight = 50%, 5 Year maturity weight = 50%
      iii. Net maturity > 5 years: 1 Year maturity weight = 0%, 5 Year maturity weight = 100%
   c) **Determine risk weight** for security using Tranche Type, rating and net maturity. Tranche Type = Senior is called senior tranche and Tranche Type = Mezzanine and Junior are called junior tranches. I will use this tranche classification for next examples.

     i.   **Security Tranche Type = Senior.** Pick tranche type and rating from security and look into sheet 'SecuritizaRW-LT' where Rating needs to be searched in column A(rating) and pick column B(Senior 1 year RW%) and C(Senior 5 Year RW%) . So we will get 1 year and 5 year risk weight% for senior tranche.

     ii.   **Security Tranche Type = Junior.** Pick tranche type and rating from security and look into sheet 'SecuritizaRW-LT' where Rating needs to be searched in column A(rating) and pick column D(Junior 1 year RW%) and E(Junior 5 Year RW%) . So we will get 1 year and 5 year risk weight% for junior tranche.

     iii.   **If Risk weight still not found:** If you could not find risk weight using steps I and ii then search in sheet 'SecuritizaRW-ST' by plugging rating in column A and reading a risk weight% in column B. Rows 2, 3 and 4 provide RW% for 2 ratings each, for example row 2 provides RW% for A-1 and P-1. So same RW% of 15% applies for both A-1 and P-1.

d) **Tranche thickness**(T) which is (Detachment point-Attachment point)

e) **Combined risk weight for security:** Final risk weight = (1 Year risk weight*1 year maturity weight + 5 Year risk weight*5 year maturity weight)/10000
I divided by 10000 because both Risk weight and year weights were in %
If Risk weight was derived from sheet 'SecuritizaRW-ST' then Final risk weight = Risk weight/100 because this risk weight is in %

f) **Final risk weight** = Combined risk weight*(1-min(T,50%)/100)

6. Calculation of HBR in a bucket i.e. Hedge benefit ratio. Basically it measures effectiveness of hedging or netting. If there is hedging via short exposures then HBR would be less than 100%.
0 means 100% hedging.
100% means 0% hedging

$$\text{HBR} = \frac{\sum net\ JTD_{long}}{(\sum net\ JTD_{long} + \sum |net\ JTD_{short}|)}$$

    We will calculate HBR for each bucket, so we will get 6 HBRs i.e. my holdings are in 6 buckets only.

7. Bucket DRC $= \max[(\sum_{i \in Long} RW_i . net\ JTD_i) - HBR.(\sum_{i \in Short} RW_i . |net\ JTD_i|)\ ; 0]$
DRC has to be calculated for each bucket, so we will calculate 6 Default Risk charges.

8. Sum all 6 bucket DRCs to give DRC securitization capital charge.