

SOFTWARE IMPLEMENTATION:

(1) Mode of validation: None, Manual, Partly automated [partly manual, partly automated e.g., MS-EXCEL], Fully automated [i.e., a validation software was used]

Partly automated

Rank Violation is checked by Java Program. It checks for violation among the allotted candidates. Another part also check for candidates those who have not got any seat, if any injustice is done to them.

Other checking is done through SQL Commands.

(2) Whether the test data was run through a “data pipeline” that tested the validity of the input [input sanity check was done or not]. If yes, where was this pipeline implemented?

Be specific and to the point; do not write generic statements like “everything is OK”, “we have tested this”, etc. Specify the input/output [expected and obtained] and the nature of analysis done clearly.

Databases Downloaded by IIT Kharagpur Team ([JoSAA_\[Jul 6 2015 7-10-42-280PM\].bak](#))

Results of TCR and NIC Implementations matched; No Rank Voilations Found

Business rule tested	Outcome
Qualifying examination	<p><i>Verified through validation code (Annexure-1) in allocations in all rounds– No Advanced Disqualified candidate is allotted a seat in IITs and no Main disqualified candidate allotted seat in NITs, IIITs and GFTIs.</i></p> <p><i>SQL Query Executed is :</i></p> <pre> SELECT count (*) FROM iAllotment INNER JOIN Candidate on Candidate.RollNo = iAllotment.RollNo And iAllotment.Instcd like '1%' and Candidate.Adv_Rem_Symb<>'N'; -- Returns 10033 indicating IIT Seats allotted only IIT Qualified Candidates SELECT * FROM iAllotment INNER JOIN Candidate on Candidate.RollNo = iAllotment.RollNo And iAllotment.Instcd like '1%' and Candidate.Adv_Rem_Symb='N'; -- Returns 0 indication No IIT Seat is allotted Advanced disqualified student. </pre>

Seat category versus category tag	<p><i>Verified through SQLs -</i> <i>For ex:</i></p> <pre>--- select COUNT(*) from Candidate inner join iAllotment on Candidate.RollNo=iAllotment.Rollno and Candidate.CAT='GN' and iAllotment.AllottedCat not like 'OP%' ---</pre> <p>returns 0; indicating that GN candidates are not given other category seats.</p> <p><i>No Mistakes found.</i></p>																							
Seat quotas in NITs	<i>Checked through SQLs</i>																							
Special cases of quotas in NITs																								
Preparatory course seat allocations?	<p><i>Checked through SQLs</i></p> <pre>select count(*) from Candidate where rollno in (Select rollno from iAllotment where Flag='P') and Adv_IsPrep<>1; returns 0;</pre> <pre>select count(*) from Candidate where rollno in (Select rollno from iAllotment where Flag='P') and Adv_IsPrep=1; returns 183;</pre>																							
Business rules #18 and #19	<p><i>{Whether the sequence of seat categories described in this business rule is strictly adhered to or not}</i></p> <p><i>GFTI Dataset Checked Business Rule 19</i></p> <p><i>IIT KGP Code checks for Rules 18 and 19, through merit violations: No merit violation implies Rules 18 and 19 are followed.</i></p>																							
Same rank – multiple students case	<p><i>Checked – supernumerary reason being EQ in ProgramStatistics Table – checked manually</i></p> <pre>SELECT SupNumreason, count(*) FROM [FRMOCK_04JUL06H].[dbo].[iAllotment] group by SupNumreason;</pre> <table border="1"> <thead> <tr> <th>SupNumreason</th> <th>Count</th> </tr> </thead> <tbody> <tr> <td>FR</td> <td>25</td> </tr> <tr> <td>EQ</td> <td>2</td> </tr> <tr> <td>NA</td> <td>33758</td> </tr> </tbody> </table> <p>The following Query Returns EQ candidates</p> <pre>select RollNo,Name,Adv_cr1_rank from Candidate where Adv_CRL_Rank in (select adv_cr1_rank from candidate where rollno in (SELECT rollno FROM [FRMOCK_04JUL06H].[dbo].[iAllotment] where SupNumReason='EQ'));</pre> <table border="1"> <thead> <tr> <th>RollNo</th> <th>Name</th> <th>Adv_cr1_rank</th> </tr> </thead> <tbody> <tr> <td>10926767</td> <td>PERAVALI SAI KIRAN</td> <td>8653</td> </tr> <tr> <td>33515900</td> <td>GUNTURU NAGA SAI PRANEETH</td> <td>2657</td> </tr> <tr> <td>24201298</td> <td>SARAP PRANJALI GAJANAN</td> <td>8653</td> </tr> <tr> <td>31112943</td> <td>SUYASH GOYAL</td> <td>2657</td> </tr> </tbody> </table>	SupNumreason	Count	FR	25	EQ	2	NA	33758	RollNo	Name	Adv_cr1_rank	10926767	PERAVALI SAI KIRAN	8653	33515900	GUNTURU NAGA SAI PRANEETH	2657	24201298	SARAP PRANJALI GAJANAN	8653	31112943	SUYASH GOYAL	2657
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DS candidates	<p><i>Checked through SQLs.</i></p> <p>-----</p> <pre>select Candidate.RollNo,Candidate.Adv_CRL_Rank,iAllotment.InstCd, iAllotment.BrCd,iAllotment.AllottedCat from Candidate inner join iAllotment on Candidate.RollNo=iAllotment.Rollno and Candidate.Adv_DS='1' and iAllotment.Flag = 'D'</pre> <table border="1"> <thead> <tr> <th>RollNo</th> <th>Adv_CRL_Rank</th> <th>InstCd</th> <th>BrCd</th> <th>AllottedCat</th> </tr> </thead> <tbody> <tr> <td>15903339</td> <td>18038</td> <td>104</td> <td>4110</td> <td>OPNO</td> </tr> <tr> <td>31305774</td> <td>18951</td> <td>102</td> <td>4110</td> <td>OPNO</td> </tr> <tr> <td>63302309</td> <td>6940</td> <td>104</td> <td>4110</td> <td>OPNO</td> </tr> </tbody> </table> <p>-----</p> <p><i>Return 3; indicating 3 Candidates are given seats from DS Category.</i> <i>In all Candidate table contained 7 DS candidates. The following SQL shows 3 DS are allotted a normal seat based on merit</i></p> <p>---</p> <pre>select Candidate.RollNo, Candidate.Adv_CRL_Rank, iAllotment.Flag, iAllotment.InstCd, iAllotment.BrCd,iAllotment.AllottedCat from Candidate inner join iAllotment on Candidate.RollNo = iAllotment.Rollno and Candidate.Adv_DS='1' and iAllotment.Flag <> 'D'</pre> <p>-----</p> <table border="1"> <thead> <tr> <th>RollNo</th> <th>Adv_CRL_Rank</th> <th>Flag</th> <th>InstCd</th> <th>BrCd</th> <th>AllottedCat</th> </tr> </thead> <tbody> <tr> <td>13614035</td> <td>NULL</td> <td>N</td> <td>308</td> <td>4146</td> <td>STNO</td> </tr> <tr> <td>13930653</td> <td>NULL</td> <td>P</td> <td>113</td> <td>4109</td> <td>SCPH</td> </tr> <tr> <td>13952329</td> <td>NULL</td> <td>N</td> <td>116</td> <td>5233</td> <td>OPPH</td> </tr> </tbody> </table>	RollNo	Adv_CRL_Rank	InstCd	BrCd	AllottedCat	15903339	18038	104	4110	OPNO	31305774	18951	102	4110	OPNO	63302309	6940	104	4110	OPNO	RollNo	Adv_CRL_Rank	Flag	InstCd	BrCd	AllottedCat	13614035	NULL	N	308	4146	STNO	13930653	NULL	P	113	4109	SCPH	13952329	NULL	N	116	5233	OPPH
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Foreign nationals	<p><i>Whether allocation for foreign national in the OPEN category or not: YES</i> <i>Checked manually</i></p> <p>---</p> <pre>select COUNT(*) as NumC from Candidate as C inner join iAllotment as A on C.RollNo=A.Rollno and C.Nationality='2' and AllottedCat not like 'OP%';</pre> <p>---</p> <p><i>Returns 0; indicating that Foreign National is not allotted a seat from other category.</i></p>																																												
De-reservation																																													
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Freezing, floating, sliding options																																													
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Change of category																																													
Change of state code of eligibility																																													
Ineligible candidates	<i>Checked: No Discrepancy/RV found in allocation</i>																																												

INPUT SANITY CHECK

1. Class XII marks – for JEE (Main) – 45% for B.Eng., 50% for B.Arch. – the nature of output that is issued if the input fails this test – then, what happens to the program? Does it stop OR ignore this candidate and proceed .

2. Does each and every candidate has a category tag? What happens if this data field is missing?

Category Tag is given by NIC and All of them have the tag.

3. Whether each and every candidate has at least one of JEE (Main) B.Eng., JEE (Main) B.Arch., or JEE (Adv) rank? If not, what happens to the program?

Validations Checks Fails. Allocation completed with wrong results. NULL Ranks are getting converted to 0 and allocation is being done of Supernumerary

4. Whether the candidate's category tag and the rank lists in which the candidate is present are consistent with each other? Here, category tag includes PwD status also?

Yes. Ranking Software did that.

5. Does a candidate who has DS certificate is indeed present in the common merit list?

Yes.

The following query

```
--  
select COUNT(*) from Candidate where Adv_DS='1' and Adv_CRL_Rank <= 0;  
--
```

Returns 0; indicating all DS candidates have Adv_CRL_Rank

6. Is the presence of a candidate is >1 ranklist consistent? For example, are there any OBC/SC/ST candidates who are in the common rank list but not in the OBC/SC/ST merit list? Similarly, for the PwD rank lists also.

Yes. Ranking Software does that. There is no such instance.

7. Is each and every foreign national present in the common rank list?

Yes. Checked through SQLs

```
SELECT COUNT(*) FROM iAllotment* INNER JOIN Candidate on Candidate.RollNo =  
iAllotment.RollNo And Candidate.Nationality=2 and Candidate.Adv_CRL_Rank<=0;  
--
```

Returns 0; indicating no allotment is made to a Foreign National candidate without a Adv_CRL_Rank;

```
SELECT COUNT(*) FROM iAllotment INNER JOIN Candidate on Candidate.RollNo =  
iAllotment.RollNo And Candidate.Nationality=2 and Candidate.Adv_CRL_Rank>0;  
[or]  
SELECT COUNT(*) FROM iAllotment where Flag='F';  
--
```

Returns 27;

**Record present in iAllotment indicates that a seat is allotted to a Candidate.*

8. Does the entry for each and every candidate complete vis-à-vis the mandatory fields: e.g., class XII marks, at least one JEE (Main) / JEE (Adv) rank, state code of eligibility, gender, for those who are PwD = yes, nature of physical handicap, AAT status, ...

Yes.

9. Whether the seat matrix is meaningful; for example, OPEN, OBC-NCL, SC and ST seats should be >0.

Not Responsibility of validation Team. Seat Matrix is prepared by each admitting institute and (already being circulated in mdb form by NIC)

OUTPUT TRAIL / LOG

1. What are contents of the output trail/log e.g., number of seats de-reserved, number of supernumerary seats allocated and the reason for the same, opening-closing ranks, seat category for each candidate, etc.

Program statistics generated by the Two Implementations are examined for all the parameters.

ANNEXURE – 1
(Rank Violation Pseudo-code)

1. Checking that the allotted candidate couldn't have got a better choice in the same category

```
-for every allotted candidate who has been provided a choice l >1 in
category cg
--for his choice = 1 : l - 1
---if closing rank (choice, cg) > candidate rank (cg) --> business rule
violated
---end if
--end for
-end for
```

2. Checking that the allotted candidate couldn't have got
i). any choice in any other category for the better choices or
ii). any of the higher category for the allotted choice

Use the hierarchy of categories

```
-for every allotted candidate who has been provided his choice l
--for his choice = 1 : l - 1
---for category = 1:8
----if candidate is eligible for category
-----if closing rank (choice, category) > candidate rank (category) -> business
rule violated
-----end if
----end if
---end for
--end for
--for his choice l:
---for categories =1 : allotted_category-1 \*higher categories*\
----if candidate is eligible for category
-----if closing rank (choice, category) > candidate rank (category) -> business
rule violated
-----end if
----end if
---end for
--end for
-end for
```

3. Checking all the candidates that none of their choices were available

```
-for each candidate, not allotted any seat
--for their choices = 1: l
---for each category = 1:8
----if candidate is eligible for category
-----if closing rank (choice, category) > candidate rank (category) -> business
rule violated
```

```

-----end if
----end if
---end for
--end for
-end for

```

4. DS Rule

Initialize an array to store the number of DS candidates for each institute.

```

-for each allotted candidate,
-- if the flag "D" is provided in the allotment file → increment the number of DS
candidates for the allotted institute
--end if
-end for

-for each institute
--if the number of DS candidates >2 → Business Rule violates
--end if
-end for

```

5. Same rank – multiple students case

Whether candidates with the same rank and same preference are allocated seats as per this business rule?

To check this case, cases 1 and 2 were extended to check that for any better choice of a candidate, if closing rank == candidate's rank, there is a violation of this rule.

Rule used:

```

-for every allotted candidate who has been provided a choice l >1 in category cg
--for his choice = 1 : l - 1
---if closing rank (choice, cg) = candidate rank (cg) --> business rule violated
---end if
--end for
-end for

```

6. Whether JEE (Main) qualified alone are allotted NIT seats and JEE (Advanced) qualified alones are allotted IIT seats; comment on B.Eng. and B.Arch. of JEE (Main) also.

Rule used:

```

For each candidate cg
    Find whether the allotted seat is from [IIT, NIT] and whether from [Arc]

    If this seat is from Arc,
        check if the candidate is Arc qualified

```

If this seat is from IIT,
 check if the candidate has an advanced rank
else (If this seat is from NITs),
 check that the candidate is main qualified

**7. Whether the allocated seat category is consistent with the category tag of the candidate?
See BR 10**

Rule used:

For each candidate cg
 Find the allotted Category as well as the category of the candidate.

If the allottedcategoryisnot OPNO,
 Check the consistencyfrom Table given for BR 10
 i). OPPH canbeallotted to anycategoryendingwith _PD
 ii). Otherscanbeallottedonly to their respective categories

8. Whether candidates allocated seats in Home State quota are really Home state candidates and vice versa?

Rule used:

For each candidate allotted
 under HS in NIT,
 check if the candidate's state-id is the same as the home state of the
 branch
 under OS in NIT,
 check if the candidate's state id is not the same as the home state of
the branch

9. Are candidates allocated seats for preparatory courses are really in preparatory rank lists AND not in regular rank lists

Rule used:

For each candidate allocated with a flag "P" (preparatory), check if he is advanced qualified. If so, flag it in the file.

10: Whether allocation for foreign national in the OPEN category or not

Rule used:

For each candidate allocated with a flag "F", check if the allotted category is OPNO.