CASE ASSIGNMENT

- Work in groups of five.

- Submit a complete and formal report including page numbers, titles, subtitles, references, appendices, etc.

- Present all results and comments in the main body of the report.

- Present all details of calculations, models, outputs etc. in appendix.

- Late submission will not be accepted.

- Any type of plagiarism will not be tolerated and will lead to disciplinary actions.

- **Due Date: 31st of December 2015, 13:00. Please submit your report through LMS. Only ONE submission per group.**

1 Introduction

Cin Ruhi is an industrial engineer working for the Turkish Football Federation. In the beginning of the season 2015-16, he is supposed determine a complete and detailed schedule of the soccer ("didn't we just said football" :)) games. You are asked to help Cin Ruhi in determining a feasible game schedule.

2 Soccer

The Turkish Premier League has 18 teams in 2015-16 season, which are listed in the table below. You are supposed to determine a feasible league schedule, which consists of two parts of 17 weeks each. Each team will play every other team in the league, once at home stadium and once at the opponent's stadium.

Unfortunately for Cin Ruhi, the problem is a little bit of complex than this description as there are several side constraints that has to be satisfied:

- Genclerbirligi and Osmanlispor play their home game at the same stadium hence they cannot both have a home game in the same week.

- Besiktas and Basaksehir have a similar constraint (sharing the stadium) however only for the first half of the season.

Table 1: Turkish Premier League Teams

1	AKHISAR BELEDIYE GENLIK VE SPOR
2	ANTALYASPOR
3	BESIKTAS
4	BURSASPOR
5	CAYKUR RIZESPOR
6	ESKISEHIRSPOR
7	FENERBAHE
8	GALATASARAY
9	GAZIANTEPSPOR
10	GENLERBIRLIGI
11	KASIMPASA
12	KAYSERISPOR
13	MEDICANA SIVASSPOR
14	MEDIPOL BASAKSEHIR
15	MERSIN IDMANYURDU
16	OSMANLISPOR FUTBOL KULUBU
17	TORKU KONYASPOR
18	TRABZONSPOR

- Fenerbahce - Galatasaray and Galatasaray - Fenerbahce games cannot be the first, second or the last games of the season.

- Kayserispor should play either Bursaspor or Kasimpasa at week 9 but it could be a home game or an away game.

- If Gaziantepspor is playing with Basaksehir at any week, then Caykur Rizespor should play Mersin Idmanyurdu.

- Konyaspor should either play a home game at week 12, or should play against Akhisar at week 15 at Akhisar's stadium.

- At week 6, At least two of teams Galatasaray, Trabzonspor, and Besiktas should play against at least two of the teams Fenerbahce, Sivasspor and Eskisehirspor.

- As a general rule, the schedule in the first half is repeated exactly in the second half with home and away teams switched.

3 Basketball

Having done a great job at TFF, Cin Ruhi decided to live abroad for a while and find a job at National Collegiate Athletic Association (NCAA) in the US. He knew that the sports

scheduling is more complicated in US compared to Turkey but he also knew that he was up for the challenge. He is given the following assignment in the fisrt day of th job.

The ACC schedule is played over 9 weeks. Each week contains 2 slots. The slots are numbered 1,2,..., 18. Odd numbered slots are weekday games. Even numbered slots are weekend games. Each team plays 16 conference games in the 18 slots. The remaining 2 slots are byes. Each team plays 5 others home and away, 3 home only and 3 away only. The assignments are given in the following table.

Table 2: ACC Schedule

2016-17: School	Primary Partners Home & Away		Rotating Partners Home & Away			Rotating Partners Home			Rotating Partners Away		
Boston College	Mia.	VT	Clem.	Duke	FSU	Md.	UNC	UVa	GaT	NCS	WF
Clemson	GaT	FSU	BC	Duke	Md.	Mia.	UNC	UVa	NCS	VT	WF
Duke	UNC	Md.	BC	Clem.	GaT	FSU	VT	WF	Mia.	NCS	UVa
Florida State	Mia.	Clem.	BC	GaT	Md.	NCS	VT	WF	Duke	UNC	UVa
Georgia Tech	Clem.	WF	Duke	FSU	UNC	BC	NCS	VT	Md.	Mia.	UVa
Maryland	Duke	UVa	Clem.	FSU	NCS	GaT	Mia.	UNC	BC	VT	WF
Miami	BC	FSU	UVa	VT	WF	Duke	GaT	NCS	Clem.	Md.	UNC
North Carolina	Duke	NCS	GaT	VT	WF	FSU	Mia.	UVa	BC	Clem.	Md.
NC State	UNC	WF	Md.	UVa	VT	BC	Clem.	Duke	FSU	GaT	Mia.
Virginia	VT	Md.	Mia.	NCS	WF	Duke	FSU	GaT	BC	Clem.	UNC
Virginia Tech	UVa	BC	Mia.	UNC	NCS	Clem.	Md.	WF	Duke	FSU	GaT
Wake Forest	GaT	NCS	Mia.	UNC	UVa	BC	Clem.	Md.	Duke	FSU	VT

The following pattern constraints must be satisfied.

- 3 home games in a row is not allowed.

- 3 away games in a row is not allowed.

- 4 away games in 5 consecutive slots is not allowed.

- Each team must have at least 4 weekend games at home.

Required Byes:

- Slot 1: Duke, UNC

- Slot 8: UNC

- Slot 12: GT

- Slot 16: Duke

- Slot 2: UVA

Fixed Games (first team is the home team):

- Slot 6: UNC - GT

- Slot 1: FSU-Clem, VT-WF, BC-MD, (UVA or Miami)-GT or Miami, Miami-NCST or NCST-UVA

- Slot 18: UNC-DUKE, MD-NCST or NCST-MD, GT-BC

- Slot 11: Duke-UNC

- Slot 8: Duke-BC

- Slot 14: Duke-GT

Must be Away or Bye:

- FSU: slots 7 and 10

- NCST: slots 11 and 12

- WF: slot 16

Single Games must be odd slot:

- Duke-WF

Single Games must be even slot:

- Duke-VT

- NCST-BC

- NCST-Duke

- BC-UNC

- MD-UNC

Double games should be played one in an even slot and the other in an odd slot. If that is not possible then get as many as possible with the following ones have priority in the indicated order:

- Duke/MD,

- UNC/NCST

- UNC/WF

- MD/NCST

- NCST/WF

- GT/UNC

- VT/UNC