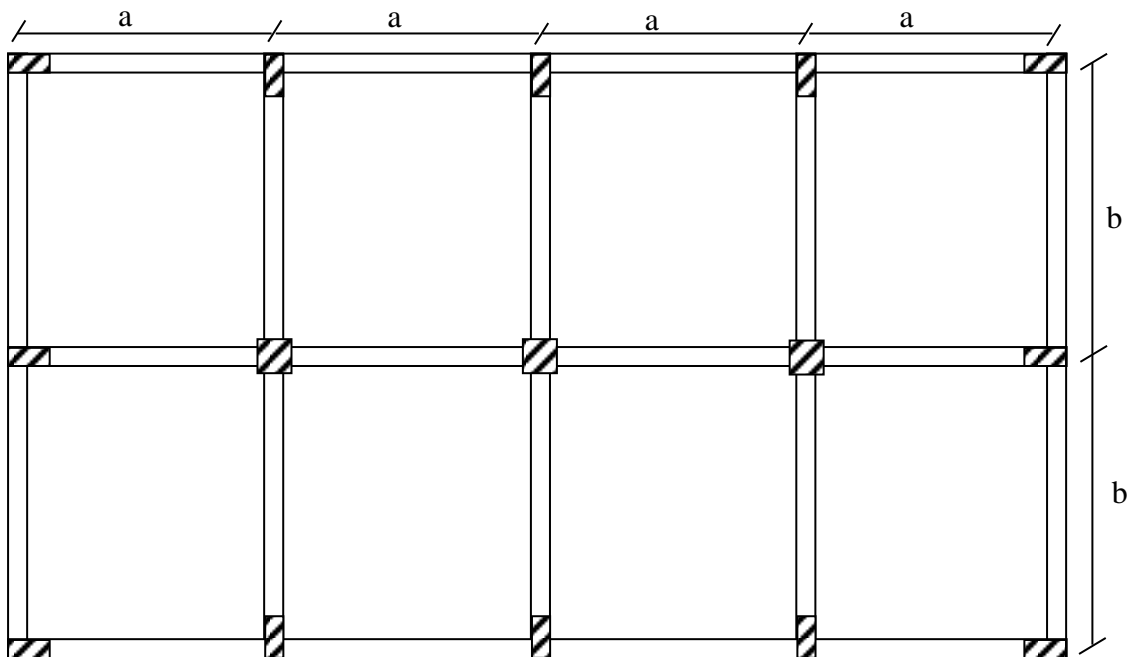


A reinforced concrete building frame is given below with the following properties.

- Story height is 3 meters.
- All floors have the same the architectural and structural plans.
- Building is R/C frame, with $E_c = 25 \times 10^6 \text{ kN/m}^2$.
- Building is used as residence.
- Foundation has sufficient strength.
- Floor slabs are rigid diaphragms in their own plane.
- Beams are 25x45 cm, square columns are 40x40 cm and slab thickness is 15 cm.
- Span dimensions (a, b), rectangular column dimensions (CD), and number of stories (N) vary as indicated in the following table. Each student is assigned a unique set of a, b, CD and N values.

Dynamic masses of the stories must be calculated according to Turkish Earthquake Code (2007), Section 2.7.1.2, and TS 498.

- Prepare a structural model of the building using SAP2000.
- Make an eigenvalue analysis to calculate the first 6 modes. Express the results in tabular and graphical forms.
- Calculate the modal masses, effective modal masses and modal forces for the first 3 modes in each direction (hand calculation is required). Then, check Eq. 2.14 in Turkish Earthquake Code to calculate the minimum number of modes to be considered in design. Show your calculations.



IMPORTANT REMARKS:

- You should submit your SAP2000 model files (i.e. soft copy of your work) that you utilized for your calculations to **Kaan Kaatsız (via e-mail)**. If you do not submit the soft copy of your homework, it will not be graded.
- Submit your analysis model as a single zipped file and do not forget to include your full name and ID in your file names, etc.
- Provide an illustrative and neatly presented hard copy of your homework. Give a clear description of your analysis model and explain your modelling decisions in detail.
- For large files that you wish to submit, please send a cloud link of the file from platforms such as Dropbox, Google Drive, OneDrive, etc. rather than sending the file.

#	Id Number	Last Name	First Name	a (m)	b (m)	CD (cmxcm)	N
1	1809227	AKDENİZ	İZEL	5	5	25x50	6
2	1550086	AKSOY	AYKUT	4	4	25x40	5
3	1809458	BAŞGÜL	SERHAT	4	4	25x40	7
4	1736289	BOZKURT	MUHAMMET TURGAY	5	4	25x40	7
5	1736339	CEBE	YILMAZCAN	4	5	25x40	5
6	1669415	CEBECİ	ATALAY	4	4	25x50	7
7	1550474	DEMİRCİ	HALİL	5	4	25x50	7
8	1736529	DİREKÇİ	LEVENT	5	4	25x40	6
9	1736511	DÜZENLİ	EREN	4	5	25x50	7
10	1384890	EMRE	BERKAN	5	4	25x50	5
11	1736578	ERDOĞAN	ÇAĞRI	5	4	25x40	4
12	1701325	GORGANI	DANIAL	4	4	25x50	6
13	1193226	GÖKMEN	SERKAN	4	5	25x40	7
14	1739085	GÜLDÜR	HAZAL	4	5	25x40	6
15	1736701	GÜLŞEN	BURAK CAN	4	4	25x50	5
16	1809821	GÜMÜŞ	HASAN	4	5	25x50	6
17	1809854	GÜRBÜZ	MÜCAHİT	4	5	25x50	4
18	1736750	IŞIK	EMRECAN	5	5	25x50	4
19	1810969	İÇİNSEL	NESİM	5	5	25x40	4
20	1809946	KARALI	SERKAN	4	5	25x50	5
21	1736818	KARAPINAR	ARİF CÜNEYT	5	4	25x50	4
22	1810001	KAYA	FATMA BEGÜM	4	5	25x40	4
23	1670033	KIRDAR	MELİH	5	4	25x40	5
24	1670041	KIRMA	MUSTAFA	4	4	25x40	6
25	1810050	KOCAKAYA	MEHMET OZAN	4	4	25x40	4
26	1810068	KOCAMAZ	KORHAN	4	4	25x50	6

#	Id Number	Last Name	First Name	a (m)	b (m)	CD (cmxcm)	N
27	1810100	KORKMAZ	BURAK	4	5	25x40	7
28	1736966	KULAY	EMRAH	4	5	25x40	6
29	1810209	KÜPÇÜ	EREN	5	5	25x50	5
30	2122885	MERCİMEK	ÖMER	5	5	25x50	6
31	1810258	MIZRAK	SEDA	4	4	25x50	5
32	1810316	OĞUZ	UMUT	4	4	25x50	4
33	1737683	ÖZDEMİR	MUSTAFA	4	5	25x40	4
34	1810845	ÖZKAN	SEDAT ANIL	5	4	25x50	5
35	1492727	ÖZTÜRK	SEDA	4	4	25x40	5
36	1701424	RUMİJA	GERTİ	5	4	25x50	7
37	1592252	SADIK	MAHMOUD	5	4	25x50	7
38	1810977	ŞAHİN	UMUTCAN	4	5	25x40	6
39	1809169	ÜNGÖR	HALİS ARDA	5	4	25x40	7
40	1828243	YILMAZ	ABDULLAH	4	5	25x40	7