

Program Title Cooling Load Calculations
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Program Description, Equations, Variables This program can be used to determine the sensible and latent cooling load of an area during three different times of the day - 10 a.m., 2 p.m., 5 p.m.. The input variables are as follows: (1) Roof area (2) Exterior wall areas (N.S.E.W.) (3) Exterior glass areas (N.S.E.W.) (4) Cooling load temperature difference (CLTD) for roof (5) Cooling load temperature difference (CLTD) for walls (6) Partition walls area (7) Ceiling area (8) Floor area (9) maximum solar heat gain factor (SHG) for exterior glass (10) total light in watts (11) Cooling load factors (CLF) for lights (12) Number of people (13) Cooling load factors (CLF) for people (14) Sensible input of mis. equipment. The output is: The internal sensible load of an area during three different hours and latent load due to people.

Necessary Accessories 1 - Card Reader 1 - Quad Memory Module

Operating Limits and Warnings Design conditions: (1) 10° N. latitude (2) amb. cond. 89°F DB/80°F WB (3) interior cond. 74°F DB/64°F WB (4) "U" roof = 0.22 (5) "U" walls = 0.33 (6) "U" glass = 0.81 (7) cooling load temp. difference (CLTD) glass: 10 am = 5; 2 pm = 14; 5 pm = 14 (8) "U" partition = 0.28 (9) temp. difference partition walls = 5°F (10) "U" ceiling = 0.26 (11) ΔT ceiling = 15°F (12) "U" floor = 0.16 (13) ΔT floor = 5°F (14) sen. people = 315 BTU/hr. person (15) latent people = 325 BTU/hr. person.

Reference(s) Cooling and Heating Load Calculation Manual (ASHRAE no. GRP158) prepared by the American Society of Heating Refrigeration and Air Conditioning Engineers, Inc.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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PROGRAM DESCRIPTION I

Program Title

Contributor's Name

Address

City

State/Country

Zip Code

Equations used: Roof, walls, glass (conduction) $q = U \times A \times CLTD$
Program Description, Equations, Variables Solar through glass - $q = A \times SC \times SHGF \times CLF$ - Partitions,
 ceilings, floors - $q = U \times A \times TD$ - Internal lights - $q = input \times CLF$ - People - (sensible) $q = no. \times sens.$
 H.G. $\times CLF$ - (latent) $q_l = no. \times LAT. H.G.$ - Appliances + power - $q = \text{Heat gain}$
 $q = \text{heat in BTU/hr.}$ - $U = \text{design heat transmission coefficient}$ - $A = \text{Area calculated from}$
 architectural plans - $CLTD = \text{cooling load temperature difference base conditions for}$
 (roofs, walls, glass) - $SC = \text{shading coefficients for combination of type of glass and type}$
 of shading - $SHGF = \text{maximum solar heat gain factor for specific orientation of surface}$
 (latitude and month) - $CLF = \text{cooling load factor}$ - $TD = \text{design temperature difference}$
 Input = input rating from electrical plans or lighting fixture data - No. = number of people
 in space - Sen. H.G. = sensible heat gain factor from occupants - $q_l = \text{latent heat in BTU/hr.}$
 Lat. H.G. = latent heat gain from occupants - Heat gain = recommended rate of heat gain.

Necessary Accessories

Operating Limits and Warnings

Reference(s)

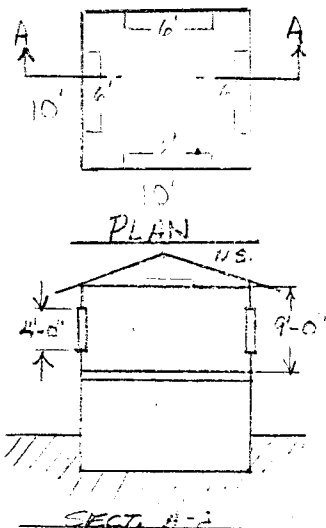
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Sample Problem (Sketch if Desired)



Lights = 250 watts
No. people = 2
Design: March/Sept.
10 hr. operation

INPUT: Roof area = 100 ft.²
Net Wall area = 66 ft.² (N.S.E.W.)
Net Wall glass = 24 ft.² (N.S.E.W.)
Floor area = 100 ft.²

*Cooling load temp. dif. (CTD):

10 am roof = 11.5
2 pm roof = 14.0
5 pm roof = 17.0

10 am N. wall = 4.3
2 pm N. wall = 12.6
5 pm N. wall = 16.8

10 am S. wall = 3.5
2 pm S. wall = 25.9
5 pm S. wall = 29.2

10 am E. wall = 31.7
2 pm E. wall = 32.5
5 pm E. wall = 26.7

*These values come from the corresp. tables in manual.

SOLUTION:

Input	Function	Display	Comments
	[XEQ] Size 012		Minimum Size
	[FIX] 2		Set Display
	[XEQ] cond. 1		Starts the program
			Enter data of area configuration
100 ft. ²	[R/S]	Roof A?	
66 ft. ²	[R/S]	Wall N?	
66 ft. ²	[R/S]	Wall S?	
66 ft. ²	[R/S]	Wall E?	
66 ft. ²	[R/S]	Wall W?	
24 ft. ²	[R/S]	GL. N?	
24 ft. ²	[R/S]	GL. S?	
24 ft. ²	[R/S]	GL. E?	
24 ft. ²	[R/S]	GL. W?	
11.5	[R/S]	CLTD R 10?	
		Q Roof 10 253.00	
		CLTD R 14?	
14	[R/S]	Q Roof 14 308.00	
		CLTD R 17?	
17	[R/S]	Q Roof 17 374.00	
		CLTD W 10?	
4.3	[R/S]	Q Wall N10 93.65	
		CLTD W 14?	
12.6	[R/S]	Q Wall N14 274.43	
		CLTD W 17?	
16.8	[R/S]	Q Wall N17 365.90	
		CLTD W 10?	
3.5	[R/S]	Q Wall S10 76.23	
		CLTD W 14?	
25.9	[R/S]	Q Wall S14 564.10	
		CLTD W 17?	
29.2	[R/S]	Q Wall S17 635.98	
		CLTD W 10?	
31.7	[R/S]	Q Wall E10 690.43	
		CLTD W 14?	
32.5	[R/S]	Q Wall E14 707.85	
		CLTD W 17?	

PROGRAM DESCRIPTION II

Sample Problem (Sketch if Desired)

INPUTS - cont'd.

CLTD ext. wall (cont'd.)

10 am W. wall = 5.2
 2 pm W. wall = 16.8
 5 pm W. wall = 40.8

Partition Area = 0
 Ceiling Area = 0
 Floor Area = 100 ft.²

***Max. solar heat gain factor (SHG)**

N. wall = 37
 S. wall = 57
 E. wall = 230
 W. wall = 230

***Cooling load factor (CLF)**

Lights:

10 am CLF = 0.64
 2 pm CLF = 0.72
 5 pm CLF = 0.76

People:

10 am CLF = 0.69
 2 pm CLF = 0.83
 5 pm CLF = 0.89

INP. EQ/MIS. Q:

Fan Motor (1/8 HP) = 900 BTU/hr.

Output Room Load:

10 am = 6695.06 BTU/hr. Sen.
 2 pm = 8312.62 BTU/hr. Sen. 650.00 BTU/hr. lat.
 5 pm = 9554.28 BTU/hr. Sen.

SOLUTION:

Input	Function	Display	Comments
26.7	[R/S]	Q Wall E17 581.53 CLTD W 10?	
5.2	[R/S]	Q Wall W10 113.26 CLTD W 14?	
16.8	[R/S]	Q Wall W14 365.90 CLTD W 17?	
40.8	[R/S]	Q Wall W17 888.62 Q GL N 10 97.20 Q GL N 14 272.16 Q GL N 17 272.16 Q GL S 10 97.20 Q GL S 14 272.16 Q GL S 17 272.16 Q GL E 10 97.20 Q GL E 14 272.16 Q GL E 17 272.16 Q GL W 10 97.2 Q GL W 14 272.16 Q GL W 17 272.16	
0	[R/S]	Part. A?	
0	[R/S]	CLG A?	
100	[R/S]	FL A?	
37	[R/S]	SHG N?	
		Q GL N 10 368.27 Q GL N 14 395.89 Q GL N 17 359.06	
57	[R/S]	SHG S?	
		Q GL S 10 411.32 Q GL S 14 191.48 Q GL S 17 191.48	
230	[R/S]	SHG E?	
		Q GL E 10 1774.17 Q GL E 14 629.54 Q GL E 17 400.62	
		SHG W?	

SOLUTION:

[illegible]

USER INSTRUCTIONS

				SIZE: (HP-41C)
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	Load , 15 sides of cards			
2	Make sure size 012			
3	Fix 2			
4	Start Program		[EXQ] COND 1	Roof A?
5	Inputs per Prompt	Roof Area	[R/S]	Wall N?
6		North Wall Area	[R/S]	Wall S?
7		South Wall Area	[R/S]	Wall E?
8		East Wall Area	[R/S]	Wall W?
9		West Wall Area	[R/S]	GL N?
10		North Glass Area	[R/S]	GL S?
11		South Glass Area	[R/S]	GL E?
12		East Glass Area	[R/S]	GL W?
13		West Glass Area	[R/S]	CLTD R-10?
14	load temp. diff. 10 am.	Roof Cooling	[R/S]	CLTD R-14?
15	load temp. diff. 2 pm.	Roof Cooling	[R/S]	CLTD R-17?
16	load temp. diff. 5 pm.	Roof Cooling	[R/S]	CLTD W-10?
17	cooling load temp. diff. 10 am.	North wall	[R/S]	CLTD W-14?
18	cooling load temp. diff. 2 pm.	North Wall	[R/S]	CLTD W-17?
19	cooling load temp. diff. 5 pm.	North Wall	[R/S]	CLTD W-10?
20	cooling load temp. diff. 10 am.	South Wall	[R/S]	CLTD W-14?
21	cooling load temp. diff. 2 pm.	South Wall	[R/S]	CLTD W-17?
22	cooling load temp. diff. 5 pm.	South Wall	[R/S]	CLTD W-10?
23	cooling load temp. diff. 10 am.	East Wall	[R/S]	CLTD W-14?
24	cooling load temp. diff. 2 pm.	East Wall	[R/S]	CLTD W-17?
25	cooling load temp. diff. 5 pm.	East Wall	[R/S]	CLTD W-10?
26	cooling load temp. diff. 10 am.	West Wall	[R/S]	CLTD W-14?
27	cooling load temp. diff. 2 pm.	West Wall	[R/S]	CLTD W-17?

PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
01	LBL	"CDH D1"		43	ARCL X		
02	"ROOF A?"		Input Roof Area calculate	44	AVIEW		
03	PROMPT		A Roof x U Roof	45	PSE		Input of CLTD for Roof
04	.22		and store	46	RCL 00		at 2 pm and calculate
05	*			47	XEQ "EF"		heat which is stored f
06	STO 00			48	STO 10		2 pm total display
07	"WALL N?"		Input Area of walls calculate	49	"Q ROOF 14 "		2 pm roof heat.
08	PROMPT		A wall x U wall	50	ARCL X		
09	XEQ "AB"		and store	51	AVIEW		
10	STO 01			52	PSE		Input of CLTD for Roof
11	"WALL S?"			53	RCL 00		at 5 pm and calculate
12	PROMPT			54	XEQ "FG"		heat which is stored f
13	XEQ "AB"			55	STO 00		5 pm total display 5 pm
14	STO 02			56	"Q ROOF 17 "		roof heat.
15	"WALL E?"			57	ARCL X		
16	PROMPT			58	AVIEW		
17	XEQ "AB"			59	PSE		
18	STO 03			60	RCL 01		Input of CLTD for North
19	"WALL W?"			61	XEQ "MN"		wall @10 am and calcu-
20	PROMPT			62	ST+ 09		late heat and add to 10
21	XEQ "AB"			63	"Q WALL N10 "		am heat.
22	STO 04			64	ARCL X		Display 10 am Nor
23	"GL. N?"		Input Glass Areas	65	AVIEW		wall heat.
24	PROMPT		calculate A Glass	66	PSE		
25	XEQ "BC"		x U Glass and	67	RCL 01		Input of CLTD for North
26	STO 05		store	68	XEQ "MO"		wall @2 pm and calcu-
27	"GL. S?"			69	ST+ 10		late heat and add to
28	PROMPT			70	"Q WALL N14 "		2 pm heat.
29	XEQ "BC"			71	ARCL X		Display 2 pm North wall
30	STO 06			72	AVIEW		heat.
31	"GL. E?"			73	PSE		
32	PROMPT			74	RCL 01		Input of CLTD of North
33	XEQ "BC"			75	XEQ "MP"		wall @.5 pm and calcu-
34	STO 07			76	ST+ 00		late heat and add to
35	"GL. W?"			77	"Q WALL N17 "		5 pm heat.
36	PROMPT			78	ARCL X		Display 5 pm North wall
37	XEQ "BC"			79	AVIEW		heat.
38	STO 08			80	PSE		
39	RCL 00		Input of CLTD for	81	RCL 02		Input of CLTD of South
40	XEQ "CD"		Roof at 10 am and	82	XEQ "MN"		wall @10 am and calcu-
41	STO 09		calculate heat	83	ST+ 09		late heat and add to
42	"Q ROOF 10 "		which is stored for 10 am total display 10 am roof heat.	84	"Q WALL S10 "		10 am heat.

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
85	ARCL X		Display 10 am S	127	ARCL X		Display 10 am W
86	AVIEW		wall heat.	128	AVIEW		wall heat.
87	PSE			129	PSE		
88	RCL 02		Input of CLTD of S	130	RCL 04		
89	XEQ "MO"		wall @2 pm and cal-	131	XEQ "MO"		Input of CLTD of West
90	ST+ 10		culate heat and add	132	ST+ 10		wall @2 pm and cal-
91	"Q WALL		to 2 pm heat.	133	"Q WALL		culate heat and add
	S14 "				W14 "		to 2 pm heat.
92	ARCL X		Display 2 pm S	134	ARCL X		Display 2 pm West
93	AVIEW		wall heat.	135	AVIEW		wall heat.
94	PSE			136	PSE		
95	RCL 02		Input of CLTD of S	137	RCL 04		Input of CLTD of West
96	XEQ "MP"		wall @ 5 pm and cal-	138	XEQ "MP"		wall @ 5 pm and cal-
97	ST+ 00		culate heat and add	139	ST+ 00		culate heat and add
98	"Q WALL		to 5 pm heat.	140	"Q WALL		to 5 pm heat.
	S17 "				W17 "		
99	ARCL X		Display 5 pm S	141	ARCL X		Display 5 pm West
100	AVIEW		wall heat.	142	AVIEW		wall heat.
101	PSE			143	PSE		
102	RCL 03		Input of CLTD of E	144	RCL 05		Calculate North glass
103	XEQ "MN"		wall @10 am and cal-	145	5		heat (conductive) at
104	ST+ 09		culate heat and add	146	*		10 am and add to 10 am
105	"Q WALL		to 10 am heat.	147	ST+ 09		heat
	E10 "			148	"Q GL N1		
106	ARCL X		Display 10 am E		0 "		
107	AVIEW		wall heat.	149	ARCL X		Display 10 am North
108	PSE			150	AVIEW		glass conductive heat.
109	RCL 03			151	PSE		
110	XEQ "MO"		Input of CLTD of E	152	RCL 05		Calculate North glass
111	ST+ 10		wall @2 pm and cal-	153	14		heat (conductive) @
112	"Q WALL		culate heat and add	154	*		2 pm and add to 2 pm
	E14 "		to 2 pm heat.	155	ST+ 10		heat.
113	ARCL X			156	"Q GL N1		
114	AVIEW		Display 2 pm E		4 "		
115	PSE		wall heat.	157	ARCL X		Display 2 pm North
116	RCL 03			158	AVIEW		glass conductive heat.
117	XEQ "MP"		Input of CLTD of E	159	PSE		
118	ST+ 00		wall @5 pm and cal-	160	RCL 05		Calculate North glass
119	"Q WALL		culate heat and add	161	14		heat (conductive) @
	E17 "		to 5 pm heat.	162	*		5 pm and add to 5 pm
120	ARCL X			163	ST+ 00		heat.
121	AVIEW		Display 5 pm E	164	"Q GL N1		
122	PSE		wall heat.		7 "		
123	RCL 04			165	ARCL X		Display 5 pm North
124	XEQ "MN"		Input of CLTD of W	166	AVIEW		glass conductive
125	ST+ 09		wall @10 am and cal-	167	PSE		heat.
126	"Q WALL		culate heat and add	168	RCL 06		
	W10 "		to 10 am heat.	169	5		

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STEP/ LINE	KEY ENTRY	KEY CODE (87/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (87/97 only)	COMMENTS
170	*		Calculate S glass	213	ARCL X		Display 5 pm E glass
171	ST+ 09		heat (conductive)	214	AVIEW		conductive heat.
172	"Q GL S1		@10 am and add to	215	PSE		
	0 "		10 am heat.	216	RCL 08		Calculate W glass
173	ARCL X		Display 10 am S	217	5		heat (conductive)
174	AVIEW		glass.conductive	218	*		@10am and add to
175	PSE		heat.	219	ST+ 09		10am heat.
176	RCL 06		Calculate S glass	220	"Q GL W1		
177	14		heat (conductive)		0 "		
178	*		@2 pm and add to	221	ARCL X		Display 10am W
179	ST+ 10		2 pm. heat.	222	AVIEW		glass conductive
180	"Q GL S1			223	PSE		heat.
	4 "			224	RCL 08		Calculate W glass
181	ARCL X		Display 2 pm S	225	14		heat (conductive)
182	AVIEW		glass conductive	226	*		@ 2pm and add to
183	PSE		heat.	227	ST+ 10		2pm heat.
184	RCL 06		Calculate S glass	228	"Q GL W1		
185	14		heat (conductive)		4 "		
186	*		@ 5 pm and add to	229	ARCL X		Display 2 pm W
187	ST+ 00		5 pm heat.	230	AVIEW		glass conductive
188	"Q GL S1			231	PSE		heat.
	7 "			232	RCL 08		Calculate W glass
189	ARCL X		Display 5 pm S	233	14		heat (conductive)
190	AVIEW		glass conductive	234	*		@ 5pm and add to
191	PSE		heat.	235	ST+ 00		5 pm heat.
192	RCL 07		Calculate E glass	236	"Q GL W1		
193	5		heat (conductive)		7 "		
194	*		@ 10 am and add to	237	ARCL X		Display 5 pm W
195	ST+ 09		10 am heat.	238	AVIEW		glass conductive
196	"Q GL E1			239	PSE		heat.
	0 "			240	"PART. A		
197	ARCL X		Display 10 am E		?"		Input partition
198	AVIEW		glass conductive	241	PROMPT		area-calculate
199	PSE		heat.	242	.28		heat and add to
200	RCL 07		Calculate E glass	243	*		10am,2pm,and 5pm
201	14		heat (conductive)	244	5		heat.
202	*		@ 2 pm and add	245	*		
203	ST+ 10		to 2 pm heat.	246	ST+ 09		
204	"Q GL E1			247	ST+ 10		
	4 "			248	ST+ 00		
205	ARCL X		Display 2 pm E	249	"Q PART.		Display partition
206	AVIEW		glass conductive		= "		wall heat.
207	PSE		heat.	250	ARCL X		
208	RCL 07		Calculate E glass	251	AVIEW		
209	14		heat (conductive)	252	PSE		
210	*		@ 5 pm and add	253	"CLG. A?		
211	ST+ 00		5 pm heat.		"		
212	"Q GL E1						
	7 "						
				00			

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
254	PROMPT		Input ceiling area.	298	ARCL X		Display solar heat
255	.26		calculate heat and	299	AVIEW		N glass @2pm.
256	*		add to 10am,2pm	300	PSE		
257	15		and 5pm heat.	301	RCL 05		
258	*			302	.78		Calculate N solar
259	ST+ 09			303	*		glass heat @5pm
260	ST+ 10			304	ST+ 00		and add to 5 pm
261	ST+ 00			305	"Q GL. N		heat.
262	"Q CLG.=				17 "		
263	ARCL X		Display ceiling	306	ARCL X		Display solar heat
264	AVIEW		heat.	307	AVIEW		N glass @5pm.
265	PSE			308	PSE		
266	"FL. A?"			309	RCL 06		
267	PROMPT		Input floor area.	310	.64		Input of SHG
268	.16		Calculate heat	311	*		South glass.
269	*		and add to 10am,	312	"SHG. S?"		
270	5		2pm and 5pm heat.		"		
271	*			313	PROMPT		
272	ST+ 09			314	*		
273	ST+ 10			315	STO 06		Calculate S solar
274	ST+ 00			316	.58		glass heat @10am
275	"Q FL.=			317	*		and add to 10am
	"			318	ST+ 09		heat.
276	ARCL X			319	"Q GL. S		
277	AVIEW		Display floor		10 "		
278	PSE		heat.	320	ARCL X		Display solar heat
279	RCL 05			321	AVIEW		S glass @10am.
280	.64		Input of SHG N	322	PSE		
281	*		glass.	323	RCL 06		
282	"SHG. N?"			324	.27		Calculate S solar
	"			325	*		glass heat @2pm
283	PROMPT			326	ST+ 10		and add to 2pm
284	*		Calculate N solar	327	"Q GL. S		heat.
285	STO 05		glass heat @10am		14 "		
286	.8		and add to 10am	328	ARCL X		
287	*		heat.	329	AVIEW		Display solar heat
288	ST+ 09			330	PSE		South glass @2pm.
289	"Q GL. N			331	RCL 06		
	10 "		Display solar	332	.27		
290	ARCL X		heat N glass @	333	*		
291	AVIEW		10am.	334	ST+ 00		Calculate S solar
292	PSE			335	"Q GL. S		glass heat @5pm
293	RCL 05		Calculate N solar		17 "		and add to 5pm
294	.86		glass heat @2pm	336	ARCL X		heat.
295	*		and add to 2 pm	337	AVIEW		
296	ST+ 10		heat.	338	PSE		Display solar heat
297	"Q GL. N			339	RCL 07		South glass @5pm.
	14 "			340	.64		
				341	*		
				342	"SHG. E?"		Input of SHG East
					"		glass.

PROGRAM LISTING

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STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
343	PROMPT		Calculate E solar	388	ARCL X		Display solar heat
344	*		glass heat @10am	389	AVIEW		West glass @2pm.
345	STO 07		and add to 10am	390	PSE		
346	.62		heat.	391	RCL 08		
347	*			392	.81		Calculate solar
348	ST+ 09			393	*		heat W glass @5pm
349	"Q GL. E			394	ST+ 00		and add to 5pm
	10 "			395	"Q GL. W		heat.
					17 "		
350	ARCL X		Display solar	396	ARCL X		Display solar heat
351	AVIEW		heat E glass @10am.	397	AVIEW		West glass @5pm.
352	PSE			398	PSE		
353	RCL 07			399	"TOT. LI		
354	.22		Calculate E solar		T. W?"		Input light
355	*		glass heat @2pm	400	PROMPT		wattage.
356	ST+ 10		and add to 2pm	401	1.25		
357	"Q GL. E		heat.	402	*		Input CLF of light
	14 "			403	3.41		@10am and calculate
358	ARCL X			404	*		10am light heat and
359	AVIEW		Display solar	405	STO 08		add to 10am heat.
360	PSE		heat E glass @2pm.	406	"CLF L10		
361	RCL 07				?"		
362	.14			407	PROMPT		
363	*		Calculate solar	408	*		
364	ST+ 00		heat E glass @5pm	409	ST+ 09		
365	"Q GL. E		and add to 5pm	410	"Q LIGHT		
	17 "		heat.		10 "		
366	ARCL X			411	ARCL X		Display light heat
367	AVIEW		Display solar heat	412	AVIEW		@10am.
368	PSE		E glass @5pm.	413	PSE		
369	RCL 08			414	RCL 08		
370	.64			415	"CLF L14		Input CLF of light
371	*				?"		@2pm and calculate
372	"SHG. W?"		Input SHG West	416	PROMPT		2pm light heat and
	"		glass.	417	*		add to 2pm heat.
373	PROMPT			418	ST+ 10		
374	*			419	"Q LIGHT		
375	STO 08		Calculate solar		14 "		
376	.15		heat W glass @10am	420	ARCL X		Display light heat
377	*		and add to 10am	421	AVIEW		@2pm.
378	ST+ 09		heat.	422	PSE		
379	"Q GL. W			423	RCL 08		Input CLF of light
	10 "			424	"CLF L17		@5pm and calculate
380	ARCL X		Display solar heat		?"		5pm light heat and
381	AVIEW		W glass @10am.	425	PROMPT		add to 5pm heat.
382	PSE			426	*		
383	RCL 08		Calculate solar	427	ST+ 00		
384	.53		heat W glass @2pm	428	"Q LIGHT		
385	*		and add to 2pm		17 "		
386	ST+ 10		heat.				
387	"Q GL. W						
	14 "						

PROGRAM LISTING

☐ 67 ☐ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS	STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
429	ARCL X		Display light	469	ARCL X		Display people
430	AVIEW		heat @5pm.	470	AVIEW		latent heat.
431	PSE			471	PSE		
432	"NO. PEO PLE?"		Input number of people.	472	"INP. EQ /MIS. Q"		Input appliance and
433	PROMPT			473	PROMPT		power heat and add
434	STO 07		Input CLF of	474	ST+ 09		heat to 10am, 2pm
435	315		people @10am and	475	ST+ 10		and 5pm heat.
436	*		calculate 10am	476	ST+ 00		
437	STO 05		people heat and	477	RCL 09		
438	"CLF P10 ?"		add to 10am heat.	478	"Q SEN. 10= "		
439	PROMPT			479	ARCL X		Display total room
440	*			480	AVIEW		heat load 10am.
441	ST+ 09			481	PSE		
442	"Q PEOPLE E S10 "		Display people heat 10am.	482	RCL 10		
443	ARCL X			483	"Q SEN. 14= "		Display total room heat load 2pm.
444	AVIEW		Input CLF of people	484	ARCL X		
445	PSE		@2pm and calculate	485	AVIEW		
446	RCL 05		2pm people heat	486	PSE		
447	"CLF P14 ?"		and add to 2pm heat.	487	RCL 00		
448	PROMPT			488	"Q SEN. 17= "		Display total room heat load 5pm.
449	*			489	ARCL X		
450	ST+ 10			490	AVIEW		
451	"Q PEOPLE E S14 "		Display people heat 2pm.	491	PSE		
452	ARCL X			492	RCL 01		
453	AVIEW			493	"Q LAT.= "		Display people latent load.
454	PSE		Input CLF of people	494	ARCL X		
455	RCL 05		@5pm and calculate	495	AVIEW		
456	"CLF P17 ?"		5pm people heat and add to 5pm heat.	496*	LBL "AB"		Subroutine to
457	PROMPT			497	.33		compute A wall x
458	*			498	*		U wall
459	ST+ 00			499	RTN		
460	"Q PEOPLE E S17"		Display people heat 5pm	500*	LBL "BC"		
461	ARCL X			501	.81		
462	AVIEW			502	*		Subroutine to
463	PSE			503	RTN		compute A glass x U glass.
464	RCL 07			504*	LBL "CD"		
465	325		Calculate people	505	"CLTD R1 0? "		Subroutine to input
466	*		latent heat.	506	PROMPT		roof CLTD @10am
467	STO 01			507	*		and compute roof
468	"Q PEOPLE E L"			508	RTN		heat @10am.

PROGRAM LISTING

☐ 67 ☐ 97 ☒ 41C

[illegible]

01 403 C

REGISTERS, STATUS, FLAGS, ASSIGNMENTS

[illegible]

PROGRAM REGISTERS NEEDED: 231

ROW 1 (1 : 2)



ROW 2 (2 : 7)



ROW 3 (7 : 11)



ROW 4 (11 : 15)



ROW 5 (15 : 18)



ROW 6 (19 : 21)



ROW 7 (22 : 25)



ROW 8 (26 : 29)



ROW 9 (30 : 33)



ROW 10 (34 : 37)



ROW 11 (38 : 42)



ROW 12 (42 : 47)



ROW 13 (47 : 49)



ROW 14 (50 : 56)



ROW 15 (56 : 60)



ROW 16 (61 : 63)



ROW 17 (63 : 68)



ROW 18 (68 : 70)



ROW 19 (70 : 76)



ROW 20 (77 : 78)



ROW 21 (78 : 84)



ROW 22 (84 : 87)



ROW 23 (88 : 91)



ROW 24 (91 : 96)



ROW 25 (96 : 98)



ROW 26 (98 : 104)



ROW 27 (104 : 105)



ROW 28 (106 : 112)



ROW 29 (112 : 114)



ROW 30 (115 : 119)



ROW 31 (119 : 124)



ROW 32 (124 : 126)



ROW 33 (126 : 131)



ROW 34 (132 : 133)



ROW 35 (133 : 140)



ROW 36 (140 : 141)



ROW 37 (142 : 148)



ROW 38 (148 : 155)



ROW 39 (155 : 157)



ROW 40 (158 : 164)



ROW 41 (164 : 171)



ROW 42 (171 : 173)



ROW 43 (174 : 180)



ROW 44 (180 : 186)



ROW 45 (187 : 189)



ROW 46 (189 : 196)



ROW 47 (196 : 202)



ROW 48 (203 : 205)



ROW 49 (205 : 212)



ROW 50 (212 : 218)



ROW 51 (219 : 221)



ROW 52 (221 : 228)



ROW 53 (228 : 233)



ROW 54 (234 : 236)



ROW 55 (237 : 240)



ROW 56 (241 : 248)



ROW 57 (249 : 251)



ROW 58 (252 : 255)



ROW 59 (256 : 262)



ROW 60 (262 : 266)



ROW 61 (266 : 272)



ROW 62 (273 : 276)



ROW 63 (276 : 282)



ROW 64 (282 : 289)



ROW 65 (289 : 292)



ROW 66 (293 : 297)



ROW 67 (297 : 302)



ROW 68 (303 : 305)



ROW 69 (305 : 312)



ROW 70 (312 : 318)



ROW 71 (318 : 320)



ROW 72 (320 : 327)



ROW 73 (327 : 331)



ROW 74 (332 : 335)



ROW 75 (335 : 341)



ROW 76 (342 : 346)



ROW 77 (346 : 349)



ROW 78 (349 : 356)



ROW 79 (357 : 358)



ROW 80 (359 : 365)



ROW 81 (365 : 370)



ROW 82 (370 : 374)



ROW 83 (375 : 379)



ROW 84 (379 : 384)



ROW 85 (385 : 387)



ROW 86 (387 : 395)



ROW 87 (395 : 397)



ROW 88 (398 : 399)



ROW 89 (399 : 405)



ROW 90 (406 : 409)



ROW 91 (410 : 411)



ROW 92 (411 : 415)



ROW 93 (416 : 419)



ROW 94 (419 : 424)



ROW 95 (424 : 428)



ROW 96 (428 : 432)



ROW 97 (432 : 435)



ROW 98 (435 : 438)



ROW 99 (439 : 442)



ROW 100 (442 : 447)



ROW 101 (447 : 451)



ROW 102 (451 : 452)



ROW 103 (453 : 457)



ROW 104 (458 : 460)



ROW 105 (460 : 467)



ROW 106 (468 : 469)



ROW 107 (470 : 472)



ROW 108 (472 : 478)



ROW 109 (478 : 479)



ROW 110 (480 : 483)



ROW 111 (483 : 488)



ROW 112 (488 : 493)



ROW 113 (493 : 496)



ROW 114 (496 : 500)



ROW 115 (500 : 505)



ROW 116 (505 : 508)



ROW 117 (509 : 510)



ROW 118 (510 : 514)



ROW 119 (515 : 517)



ROW 120 (518 : 520)



ROW 121 (520 : 524)



ROW 122 (524 : 526)



ROW 123 (527 : 530)



ROW 124 (530 : 534)

