

ANALYZING VIRTUAL MATH TEAMS ENACTING GEOMETRIC PRACTICES

LinCS Seminar, Göteborg
October 11, 2013

Gerry Stahl



Background of Data

- **Virtual Math Teams (VMT) with GeoGebra: online chat collaborative problem solving and dynamic-geometry construction environment**
- **3 girls in same 7th grade algebra class (about 13 years old); 8 one-hour sessions after school**
- **Ch 7 in *Translating Euclid***
- **Chat log excerpts in slides**
- **Complete log excerpts, can be filtered for chat, etc.**
- **Replayer files & replayer for 8 cereal-girls sessions**

Data Session

- 1. Discuss background of data
- 2. Quickly go through data from topic 1 to get a feel of how the students started in VMT as a team
- 3. Look at data from “high point” where they solved a hard problem and demonstrated understanding of dynamic-geometry dependencies (topics 5 & 6)
- 4. Consider in more detail the discourse in the final section about constraints & dependencies (topic 13)



Move

Drag or select objects (Esc)



Welcome to GeoGebra for Virtual Math Teams!

Collaborate -- Take turns -- Make sure everyone agrees

Explore Points and Segments in Dynamic Geometry

1. Use chat to decide who will do each step.
2. Someone click on the 'Take Control' button.
3. Click on the button for the Point tool at the top.
4. Now click a couple places to create some Points.
5. Release control. Let someone else take control.
6. Click on the Move tool arrow on the left.
7. With this Move tool, click on a Point and drag it.
8. Someone select the next tool, the Line Segment Tool.
9. Click on two existing Points or two other places --
to construct a line Segment between the points.
10. Switch back to the Move tool to drag the Segment.
11. Everyone explore these tools in the tool bar.
12. Chat about what you notice.

When you are finished working together in one tab, move to the next. Try to finish all the tabs.

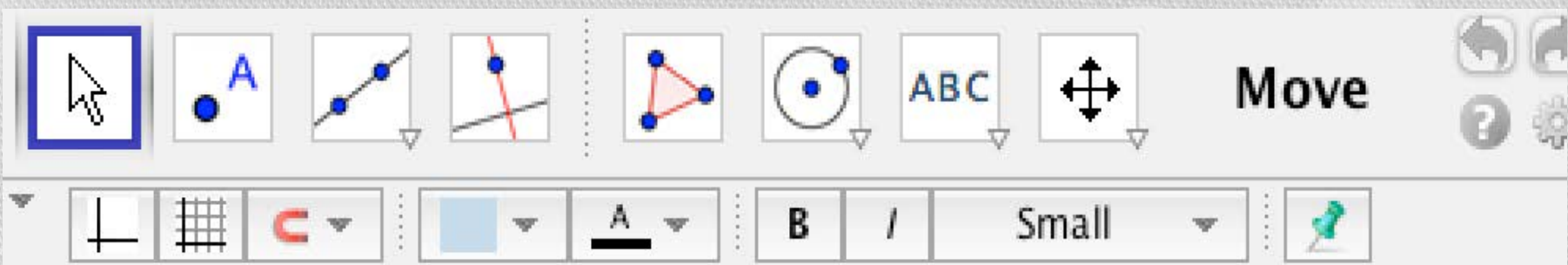
Line	Start Time	Post Time	Duration	Event Type	User	Message
1		11:46.7	0:00:00	system	cornflakes	joins the room
2		12:45.3	0:00:58	system	fruitloops	joins the room
3	13:38.8	13:39.4	0:00:00	chat	cornflakes	hey
4	13:55.4	13:57.0	0:00:01	chat	fruitloops	hello
5		14:04.6	0:00:07	system	cheerios	joins the room
6	14:18.0	14:19.1	0:00:01	chat	cheerios	hey
7	14:39.4	14:45.6	0:00:06	chat	cheerios	whose froot loops
8	14:51.5	14:53.9	0:00:02	chat	cornflakes	daniella\
9	15:04.5	15:10.8	0:00:06	chat	cheerios	whose taking control
10	15:15.5	15:20.1	0:00:04	chat	cheerios	taking*
11		15:38.5	0:00:18	system	cornflakes	Now viewing tab Hints Help
12		15:38.5	0:00:00	system	cornflakes	Now viewing tab Objects
13		15:41.1	0:00:02	system	cornflakes	Now viewing tab Dragging
14		15:42.6	0:00:01	system	cornflakes	Now viewing tab Constructing
15		15:45.4	0:00:02	system	cornflakes	Now viewing tab Dependencies
16		15:46.8	0:00:01	system	cornflakes	Now viewing tab Welcome
17		15:59.6	0:00:12	system	cornflakes	Now viewing tab Hints Help
18		16:08.0	0:00:08	system	cornflakes	Now viewing tab Objects
19	16:11.5	16:18.4	0:00:06	chat	cheerios	so whoses doing what
20		16:14.8	0:0:-3	system	cornflakes	Now viewing tab Hints Help
21		16:17.7	0:00:02	system	cornflakes	Now viewing tab Welcome
22	16:32.5	16:44.4	0:00:11	chat	fruitloops	who wants to take control?
	16:49.7	16:57.7	0:00:08	awareness	fruitloops	[fully erased the chat message]
	17:05.7	17:19.1	0:00:13	awareness	cornflakes	[fully erased the chat message]
23	17:24.7	17:30.6	0:00:05	chat	cheerios	daniella do you want to

21		16:17.7	0:00:02	system	cornflakes	Now viewing tab Welcome
22	16:32.5	16:44.4	0:00:11	chat	fruitloops	who wants to take control?
	16:49.7	16:57.7	0:00:08	awareness	fruitloops	[fully erased the chat message]
	17:05.7	17:19.1	0:00:13	awareness	cornflakes	[fully erased the chat message]
23	17:24.7	17:30.6	0:00:05	chat	cheerios	daniella do you want to
	17:37.5	17:39.9	0:00:02	awareness	fruitloops	[fully erased the chat message]
24	17:40.7	17:52.2	0:00:11	chat	fruitloops	no... cornflakes you take controll.....
25	17:55.1	18:01.7	0:00:06	chat	fruitloops	who wants to do what steps?
26	17:55.4	18:02.9	0:00:07	chat	cheerios	cornflakes take control
27	17:57.8	18:03.6	0:00:05	chat	cornflakes	no cheerios you can
28	18:06.2	18:14.6	0:00:08	chat	cheerios	cornflakes
	18:16.8	18:18.2	0:00:01	awareness	cheerios	[fully erased the chat message]
29	18:21.5	18:25.4	0:00:03	chat	fruitloops	cornflakes
30	18:33.0	18:33.6	0:00:00	chat	cornflakes	NO
31	18:37.8	18:40.0	0:00:02	chat	cheerios	why not
32	18:44.0	18:52.3	0:00:08	chat	fruitloops	i just took control. lets takes turns
33	18:56.1	19:01.9	0:00:05	chat	cheerios	alright
34	19:02.5	19:03.0	0:00:00	chat	cornflakes	ok
35	19:19.8	19:26.6	0:00:06	chat	cheerios	it says no one has control
36	19:25.1	19:30.1	0:00:04	chat	fruitloops	what do we do know?
37	19:35.3	19:44.3	0:00:08	chat	cheerios	i am not sure cornflakes do u know
	20:02.7	20:03.3	0:00:00	awareness	cheerios	[fully erased the chat message]
38	20:03.6	20:17.4	0:00:13	chat	cheerios	i think we have to follow the numbered list
39	20:17.1	20:20.0	0:00:02	chat	cornflakes	uh mo
	20:20.1	20:22.1	0:00:02	awareness	cheerios	[fully erased the chat message]
40	20:24.2	20:28.4	0:00:14	chat	cheerios	so Lets do that and we will figure it out as we go

38	20:03.6	20:17.4	0:00:13	chat	cheerios	i think we have to follow the numbered list
39	20:17.1	20:20.0	0:00:02	chat	cornflakes	uh mo
	20:20.1	20:22.1	0:00:02	awareness	cheerios	[fully erased the chat message]
40	20:24.2	20:38.4	0:00:14	chat	cheerios	so lets do that and we will figure it out as we go
41	20:45.0	20:50.6	0:00:05	chat	fruitloops	someone else take control for now
42	20:46.8	20:53.1	0:00:06	chat	cheerios	lets*
43	21:02.3	21:17.5	0:00:15	chat	fruitloops	just follow the welcome thing
	21:05.0	21:09.9	0:00:04	awareness	cheerios	[fully erased the chat message]
	21:14.3	21:19.9	0:00:05	awareness	cheerios	[fully erased the chat message]
	21:19.9	21:24.1	0:00:04	awareness	cheerios	[fully erased the chat message]
44	21:24.8	21:32.9	0:00:08	chat	cheerios	yeah so we are on #3
45	21:48.7	21:56.2	0:00:07	chat	cornflakes	ok someoen else take control
	21:55.3	21:59.4	0:00:04	awareness	fruitloops	[fully erased the chat message]
46	22:00.4	22:05.3	0:00:04	chat	fruitloops	someone take control
47	22:05.0	22:13.1	0:00:08	chat	cheerios	whats happening?
48	22:18.2	22:18.7	0:00:00	chat	fruitloops	idk
	22:21.3	22:25.0	0:00:03	awareness	cheerios	[fully erased the chat message]
49	22:27.1	22:30.8	0:00:03	chat	cheerios	i am so lost
50	22:29.2	22:36.6	0:00:07	chat	fruitloops	i took control. what should i do?
51	22:40.1	22:42.3	0:00:02	chat	cornflakes	make a line
52	22:40.8	22:50.9	0:00:10	chat	cheerios	i am not sure #3 i guess?
53	23:01.9	23:10.4	0:00:08	chat	cornflakes	no i already did 3, do 5
54	23:05.4	23:10.5	0:00:05	chat	fruitloops	okay now what?
55	23:40.3	24:02.8	0:00:22	chat	cheerios	it says to release control
56	23:42.9	23:43.6	0:00:00	chat	cornflakes	good
57	23:45.5	24:17.7	0:00:22	chat	fruitloops	now someone else continue

54	23:05.4	23:10.5	0:00:05	chat	fruitloops	okay now what?
55	23:40.3	24:02.8	0:00:22	chat	cheerios	it says to release control
56	23:42.9	23:43.6	0:00:00	chat	cornflakes	good
57	23:45.5	24:17.7	0:00:32	chat	fruitloops	now someone erlse continue
58	24:05.2	24:12.8	0:00:07	chat	cheerios	and then do #6
59	24:11.5	24:15.7	0:00:04	chat	cornflakes	then release control
60	24:22.8	24:24.7	0:00:01	chat	fruitloops	released
61	24:24.7	24:29.0	0:00:04	chat	cornflakes	cheerios will
62	24:32.6	24:44.4	0:00:11	chat	fruitloops	take control and explore with the other toolos
63	24:51.3	24:57.3	0:00:05	chat	cheerios	i just did 6
64	25:14.0	25:17.5	0:00:03	chat	cornflakes	ill do 7 then
65	25:19.9	25:21.6	0:00:01	chat	cheerios	ok
66	25:25.2	25:26.1	0:00:00	chat	fruitloops	ok
67	25:39.9	25:51.0	0:00:11	chat	fruitloops	do likie 9 and 10 also
68	25:48.9	25:50.2	0:00:01	chat	cornflakes	ok done
	25:49.6	25:51.6	0:00:01	awareness	cheerios	[fully erased the chat message]
69	26:18.7	26:24.1	0:00:05	chat	cheerios	what about 8
	26:38.6	26:41.4	0:00:02	awareness	cheerios	[fully erased the chat message]
70	26:38.8	26:41.1	0:00:02	chat	fruitloops	yeah
71	26:45.5	26:51.1	0:00:05	chat	fruitloops	can i go next?
72	26:45.7	26:46.6	0:00:00	chat	cornflakes	there
73	26:54.9	26:57.3	0:00:02	chat	cornflakes	yeah go ahead
74	26:56.1	26:57.1	0:00:01	chat	cheerios	yes
75	27:07.6	27:11.1	0:00:06	chat	fruitloops	so we just play around with it?

73	26:54.9	26:57.3	0:00:02	chat	cornflakes	yeah go ahead
74	26:56.1	26:57.1	0:00:01	chat	cheerios	yes
75	27:07.6	27:14.1	0:00:06	chat	fruitloops	so we just play around with it?
76	27:12.1	27:19.9	0:00:07	chat	cheerios	now the triangle is bigger
77	27:17.6	27:22.0	0:00:04	chat	cornflakes	i guess pretty much
78	27:30.1	27:35.5	0:00:05	chat	cheerios	are we on 11
79	27:35.1	27:44.5	0:00:09	chat	fruitloops	how do we get the line to connect to the piont?
80	27:39.2	27:41.0	0:00:01	chat	cornflakes	yes mam
81	27:44.7	27:45.2	0:00:00	chat	cheerios	kk
82	27:58.2	28:00.0	0:00:01	chat	fruitloops	nevermind
83	28:09.1	28:12.7	0:00:03	chat	cheerios	what now?
84	28:20.3	28:27.9	0:00:07	chat	cornflakes	chat about whatr we njustice?
85	28:32.2	28:41.6	0:00:09	chat	cheerios	well its a very interesting shape
	28:34.8	28:38.9	0:00:04	awareness	fruitloops	[fully erased the chat message]
86	28:42.6	29:04.0	0:00:21	chat	cheerios	a rectangle and a triangle thats mushed together
87	28:48.5	29:10.8	0:00:22	chat	cornflakes	its like a polygon
88	29:13.0	29:14.8	0:00:01	chat	cornflakes	right?
				chat	cornflakes	no curved edges cause its made of a line segment and line segments are lines and lines that dont have curves
89	29:15.3	29:38.5	0:00:23			
90	29:18.6	29:22.5	0:00:03	chat	cheerios	it has 6 sides
91	29:26.9	29:40.1	0:00:13	chat	cheerios	and obtuse and acute angles no right angles
92	29:29.9	29:34.6	0:00:04	chat	fruitloops	how do i make it smaller?
				chat	cornflakes	yuppies no right angles
93	29:50.3	29:57.4	0:00:07			
94	29:54.9	29:58.9	0:00:04	chat	fruitloops	should we move on?
95	30:01.7	30:03.5	0:00:01	chat	cornflakes	yessiree
96	30:02.1	30:11.3	0:00:09	chat	cheerios	i think we should
97		30:07.4	0:0:-3	system	cornflakes	Now viewing tab Hints Help
98		30:12.8	0:00:05	system	cheerios	Now viewing tab Hints Help
99	30:13.1	30:16.0	0:00:02	chat	fruitloops	okay lets go
100		30:18.6	0:00:02	system	fruitloops	Now viewing tab Hints Help



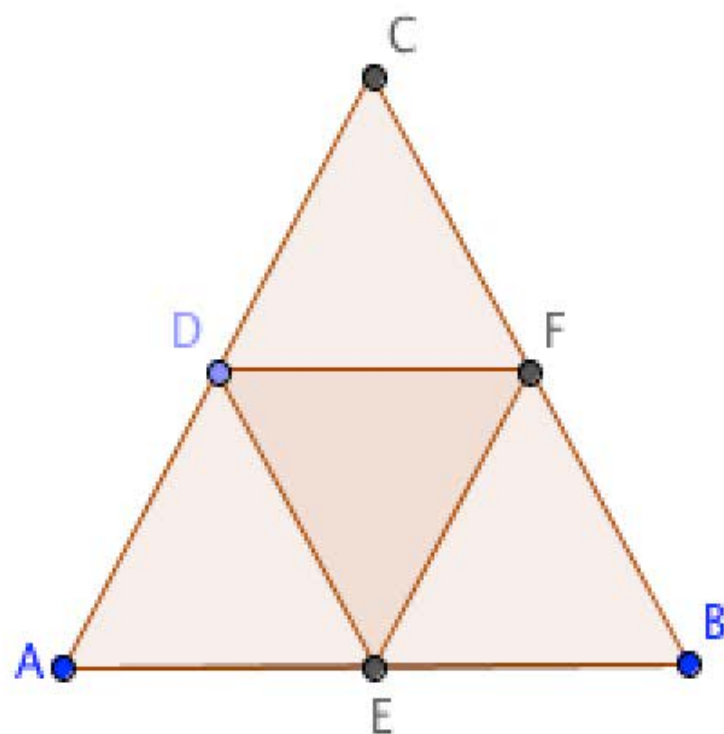
Take turns dragging vertex A of Triangle ABC and vertex D of Triangle DEF.

Chat about dependencies you notice and what you wonder about this figure.

Construct a triangle inscribed in a triangle that behaves the same as this one.

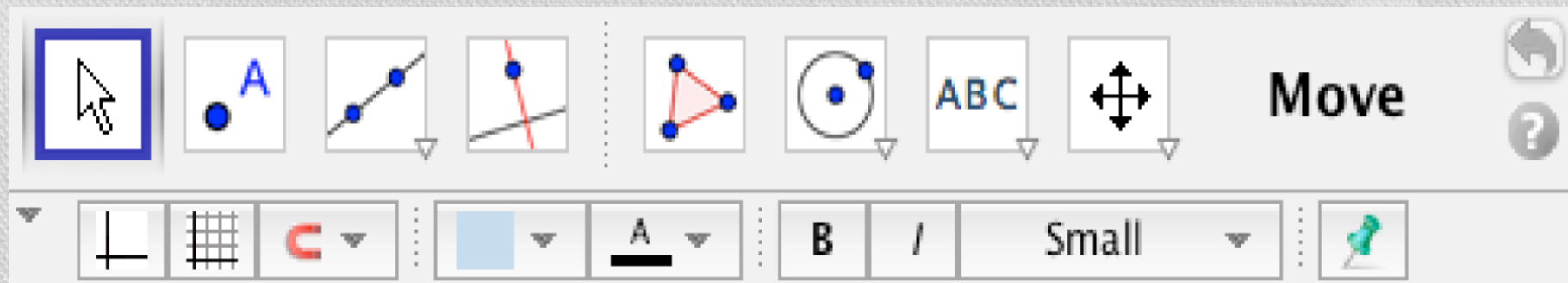
Chat about how you are constructing and why.

It might be helpful to look at the other tabs for this Topic and think about them together.



66	18:05.3	18:30.0	0:00:24	chat	cheerios	as i was movign d segment da is the same distance as segment be
	18:29.1	18:33.7	0:00:04	awareness	cornflakes	[fully erased the chat message]
67	18:45.8	18:52.0	0:00:06	chat	cheerios	and also cf
68	19:25.6	19:41.6	0:00:16	chat	cheerios	our kg is the same as ad
	19:45.1	19:49.4	0:00:04	awareness	cornflakes	[fully erased the chat message]
69	20:04.2	20:06.3	0:00:02	chat	cornflakes	agreed
70	20:04.5	20:06.5	0:00:02	chat	fruitloops	i agree
	20:38.1	20:39.1	0:00:00	awareness	cheerios	[fully erased the chat message]
				chat	cheerios	there should be a point on segment gh which is the same distance as kg and also between segment uh
71	20:39.6	21:21.8	0:00:42			
72	21:54.9	22:00.5	0:00:05	chat	cheerios	it should be ih not uh
				chat	cheerios	so i used the compass tool and measured kg and used point i as the center and created a circle
73	23:12.2	23:39.9	0:00:27			

90	16:11.8	16:18.2	0:00:06	chat	cheerios	we have to explain what we did
	17:44.5	17:45.5	0:00:00	awareness	cornflakes	[fully erased the chat message]
91	17:49.2	19:49.0	0:01:59	chat	cheerios	so first u have to plot a random point on the triangle we used k . then i realised the distance from kg is the same as im and rh
92	19:49.8	22:51.2	0:03:01	chat	cheerios	then you have to use the compass tool in are case are the length of are radius is kg so then we clicked those 2 points and used vertex i as the center the way to plot are second point of are triangle is where the circle and segment ih intersect
93	20:39.8	20:41.4	0:00:01	chat	cornflakes	right
94	22:52.0	23:53.2	0:01:01	chat	cheerios	and then we repeated that step with the other side and h was the center
95	23:35.4	23:48.8	0:00:13	chat	cornflakes	yes you had to make the point between the circles
96	24:04.9	24:21.0	0:00:16	chat	cheerios	not between the circles where the segment intersect with the circle
	24:22.3	25:37.0	0:01:14	awareness	fruitloops	[fully erased the chat message]
97	25:22.0	25:27.5	0:00:05	chat	cornflakes	yea same thing
98	25:40.7	26:04.4	0:00:23	chat	fruitloops	so then why are point m and r shaded dark and don tact the same as k
99	25:50.0	25:52.4	0:00:02	chat	cheerios	its differnt
100	25:54.5	25:58.5	0:00:04	chat	cheerios	different*
101	25:56.1	26:00.0	0:00:03	chat	cornflakes	yes i know
102	26:09.9	26:14.6	0:00:04	chat	cheerios	they are restricted
103	26:32.3	26:35.6	0:00:03	chat	fruitloops	but why????????
104	26:35.9	26:45.8	0:00:09	chat	cornflakes	yeah if its a darker its restricted i think
105	26:49.6	26:52.1	0:00:02	chat	cheerios	yes
106	26:54.4	26:56.4	0:00:02	chat	cheerios	correct
107	28:13.9	28:31.0	0:00:17	chat	fruitloops	but why are m and r restricted but k isnt?
	30:08.5	30:24.7	0:00:16	awareness	cheerios	[fully erased the chat message]
108	30:24.0	30:33.3	0:00:09	chat	cornflakes	because the invisible circlcels are still there
109	30:25.7	31:35.0	0:01:09	chat	fruitloops	okay so its because we made k by just using the point tool and putting it on the line but with m and r we maade it through using circles so technicaly, the circle is still there but its hidden but we just dont see it.



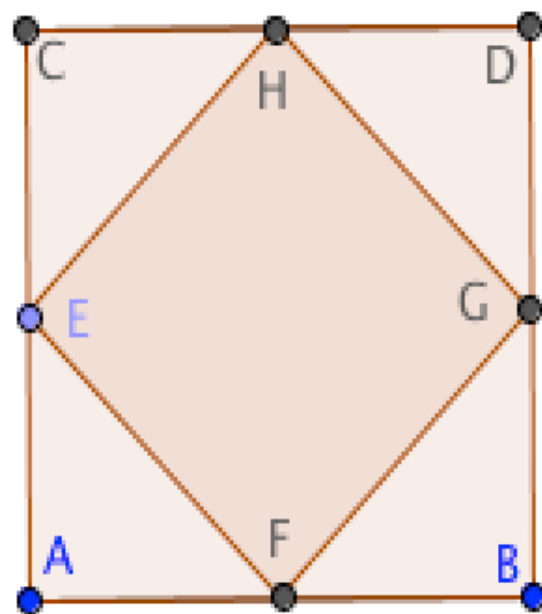
Take turns dragging vertex A of Quadrilateral ABDC and vertex E of Quadrilateral EFGH.

Chat about dependencies you notice and what you wonder about this figure.

Construct a Quadrilateral inscribed in a Quadrilateral that behaves the same as this one.

Chat about how you are constructing and why.

Note that the Compass tool is available by pulling it down from the Circle tool in the tool bar.



123	35:31.6	35:34.3	0:00:02	chat	cornflakes	E IS RESTRICTED
124	35:33.0	35:58.6	0:00:25	chat	fruitloops	do how do we create a square like the outer square?
125	36:42.1	36:54.4	0:00:12	chat	cheerios	we have to talk about the dependencies and stuff
126	36:55.8	37:01.3	0:00:05	chat	cheerios	read the instructions
127	37:28.5	38:45.9	0:01:17	chat	fruitloops	how but how do we make the square?
	38:55.0	38:56.3	0:00:01	awareness	fruitloops	[fully erased the chat message]
128	38:57.2	39:11.6	0:00:14	chat	fruitloops	like i know how to make the triangle but now the square
129	39:10.2	39:11.5	0:00:01	chat	cheerios	a grid
130	39:10.2	39:20.3	0:00:10	chat	cornflakes	olets start by constructing a regular square
131	39:15.2	39:16.5	0:00:01	chat	cheerios	a grid
	39:24.8	39:32.6	0:00:07	awareness	fruitloops	[fully erased the chat message]
132	39:33.4	39:48.0	0:00:14	chat	fruitloops	i think we should make perpendicular lines somehow
133	39:52.4	39:58.8	0:00:06	chat	cheerios	use the perpindicular line tool
134	43:13.3	43:21.9	0:00:08	chat	fruitloops	the first line segment would be like ab
135	43:27.2	43:27.7	0:00:00	chat	cornflakes	yes
136		44:12.6	0:00:25	system	cheerios	Now viewing tab Triangles
137		44:35.4	0:00:01	system	cheerios	Now viewing tab Squares
138	51:14.2	51:24.7	0:00:10	chat	cheerios	how do u know ji is straight
139	55:26.3	55:40.6	0:00:14	chat	fruitloops	i dont know what to do because the points arent the same color
140	56:26.0	56:38.2	0:00:12	chat	fruitloops	now after you make the perpendicular lines try to make the circles\
141	57:35.8	57:48.7	0:00:12	chat	fruitloops	i think you need to know use the polygon tool and make the square
				chat	cheerios	i made a line segment which was if than i used the perpendicular line tool and made 2 lines on each side then used the compass tool and clicked on each point and then the center vertex was i and then made a another circle except the center vertex is j and connected all the points
142	58:50.9	00:42.4	0:01:51			

143	58:51.5	59:10.6	0:00:19	chat	fruitloops	now we need to use the compass tool lilke we did in the triangles tab
144	59:38.3	59:57.5	0:00:19	chat	fruitloops	because af is equal to ec and dh and bc
145	00:57.6	01:15.3	0:00:17	chat	cheerios	then used to polygon tool and then hid the circles and lines
146	01:05.1	01:07.5	0:00:02	chat	fruitloops	correct
147	01:08.7	01:36.9	0:00:28	chat	fruitloops	and we used the circles to make the sides equal because the sides are their radius
148	02:29.8	02:39.8	0:00:09	chat	fruitloops	point m is like point e because it moves around
149	02:44.2	02:48.8	0:00:04	chat	fruitloops	and its the same color
150	04:11.6	04:14.4	0:00:02	chat	fruitloops	good!!
151	04:36.3	04:40.4	0:00:04	chat	fruitloops	now hide the circles
152	05:16.7	05:25.7	0:00:09	chat	fruitloops	the points match up
153	05:30.2	06:00.8	0:00:30	chat	fruitloops	it works! just like the original circl;e
154	05:39.5	05:47.2	0:00:07	chat	cheerios	yay it works
155	07:10.5	09:42.5	0:02:32	chat	cheerios	so just plotted a random point on line segment jk and then used the compass tool and clicked on point m and j (radius) and then clicked k to be the center and then plotted the point where line segment kl intersect with the circle and repeated these steps on the other sides
156	08:14.4	09:18.8	0:01:04	chat	fruitloops	i think points o, n, and p are dark because they weere made using the original circles
157	08:22.9	08:23.8	0:00:00	chat	cornflakes	yess
158	09:26.1	09:32.4	0:00:06	chat	cornflakes	yea i agreeee
159	09:45.5	10:27.8	0:00:42	chat	cheerios	the distance between m and j is the same between ok and ln and pi
160	09:57.1	10:02.9	0:00:05	chat	fruitloops	yeah i saw and i understand
161	10:03.7	10:45.0	0:00:41	chat	fruitloops	all the radii are the same so the distances from ko,ln, and ip and jm are the same
162	10:16.3	10:18.5	0:00:02	chat	cornflakes	same
163	10:52.8	10:57.3	0:00:04	chat	cornflakes	yup i agrree
164	10:59.3	11:01.3	0:00:02	chat	cheerios	yes

Topic 13: Quadrilaterals

Move Graphics View
Drag graphics view or one axis (Shift + Drag)

Can you tell how each of these quadrilaterals was constructed? What are its dependencies?

Drag the vertices of these quadrilaterals to see what is special about each one.

How many different quadrilaterals can be constructed?
Some have different number of equal sides.
Some have different number of equal angles.
Some have different number of right angles.
Some have different number of parallel sides.
Some have different number of lines of symmetry.
Some have diagonals with different characteristics.

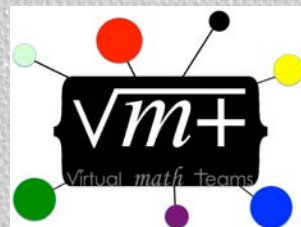
13	3/11/13	14:52.6	15:00.2	0:00:07	chat	fruitloops	lets start with quad abcd
14	3/11/13	15:06.6	15:18.5	0:00:11	chat	fruitloops	in the upper lefthand corner
15	3/11/13	15:47.0	15:47.4	0:00:00	chat	cornflakes	ok
16	3/11/13	15:54.1	16:26.5	0:00:32	chat	fruitloops	okay so for poly 1 all the points can move anywhere and i dont think they have resrictions
17	3/11/13	16:06.7	16:20.1	0:00:13	chat	cheerios	label it by saying its points
18	3/11/13	16:41.9	16:42.3	0:00:00	chat	cornflakes	ok
19	3/11/13	16:47.2	17:19.1	0:00:31	chat	fruitloops	so i think this was constructed by just making four points and using a polygon tool
20	3/11/13	17:29.5	17:38.1	0:00:08	chat	fruitloops	you guys can try moving if youd like
21	3/11/13	17:56.8	18:14.2	0:00:17	chat	cornflakes	yeah your right i dont think theres any restrictions
22	3/11/13	18:17.1	18:23.2	0:00:06	chat	cheerios	can i try
23	3/11/13	18:50.6	19:00.7	0:00:10	chat	cheerios	there are no restrictions like you said
24	3/11/13	19:14.3	19:34.6	0:00:20	chat	fruitloops	so do you agree with how i think it was constructed
25	3/11/13	19:37.9	19:38.6	0:00:00	chat	cornflakes	yes
26	3/11/13	19:42.0	19:53.4	0:00:11	chat	fruitloops	okay good

44	3/11/13	24:01.0	24:16.7	0:00:15	chat	cheerios	what si the difference between constrained and restricted
45	3/11/13	24:22.1	24:24.3	0:00:02	chat	cheerios	is*
46	3/11/13	24:23.3	24:46.4	0:00:23	chat	fruitloops	also when you move e, g moves away or closer to f
47	3/11/13	24:35.0	24:41.6	0:00:06	chat	cornflakes	constrained is limited function
48	3/11/13	24:54.2	25:08.4	0:00:14	chat	fruitloops	so i think g it definitely constrained
49	3/11/13	25:13.2	25:14.0	0:00:00	chat	cornflakes	yes
50	3/11/13	25:16.1	25:19.8	0:00:03	chat	cornflakes	i think that too
51	3/11/13	25:23.4	25:25.6	0:00:02	chat	cheerios	why though
52	3/11/13	25:36.5	25:59.3	0:00:22	chat	fruitloops	and g moves whenever you move point e and f but it doesnt move when you move h
53	3/11/13	26:07.0	26:42.4	0:00:35	chat	fruitloops	@ cheerios. i think its constrained because it moves but the function is limited
54	3/11/13	26:17.7	26:20.3	0:00:02	chat	cheerios	okay
	3/11/13	26:44.4	27:04.9	0:00:20	awareness	fruitloops	[fully erased the chat message]
55	3/11/13	27:28.4	27:37.5	0:00:09	chat	fruitloops	what is the definition of dependant
56	3/11/13	27:33.3	27:36.8	0:00:03	chat	cheerios	oh i see
57	3/11/13	28:38.0	28:52.4	0:00:14	chat	cheerios	u need the other line or point otherwise it wont work
58	3/11/13	28:43.6	28:54.6	0:00:10	chat	fruitloops	do you guys have any idea of how this was made?
59	3/11/13	28:57.1	29:15.6	0:00:18	chat	cornflakes	yeah some points are dependent on others
60	3/11/13	29:23.4	29:43.4	0:00:19	chat	cornflakes	maybe some invisible circles and the shapes could be dependent on thos circles

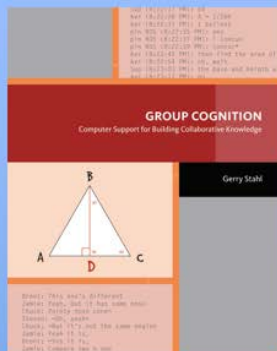
64	3/11/13	30:45.5	30:55.5	0:00:09	chat	fruitloops	i think it has to do with how it was constructed
65	3/11/13	30:57.4	31:44.4	0:00:47	chat	fruitloops	cause eremember how before in the other topic we would sometimes use circles to construct stuff and then hide the circles? well maybe this quad was made using a circle
	3/11/13	31:01.0	31:01.5	0:00:00	awareness	cheerios	[fully erased the chat message]
66	3/11/13	31:02.4	31:03.8	0:00:01	chat	cheerios	i agree
67	3/11/13	31:25.1	31:29.1	0:00:03	chat	cornflakes	YES
68	3/11/13	31:50.4	31:58.9	0:00:08	chat	cornflakes	yeah and one of the points was on the circle
69	3/11/13	32:17.3	32:38.1	0:00:20	chat	cheerios	yeah that makes sense remember when we made the triangle the same thing happened
70	3/11/13	32:42.3	32:43.0	0:00:00	chat	cornflakes	yes
71	3/11/13	33:00.4	33:10.4	0:00:10	chat	fruitloops	but i dont really know how it could have been made?
72	3/11/13	33:59.6	34:17.4	0:00:17	chat	fruitloops	do you thinkk point e is the same distance away from f as g?
73	3/11/13	34:03.8	34:14.5	0:00:10	chat	cheerios	maybe they used another shape instead of circles
74	3/11/13	34:13.7	35:03.6	0:00:49	chat	cornflakes	we coulda had a shape on a triangle or square made it invisible but in reality the other shape is still there therefore making one of tth e points that was on the shape dependent on that shape
75	3/11/13	35:06.1	35:31.9	0:00:25	chat	cheerios	i think it is the same tool maybe they used the compass tool cuz they have the same distance
76	3/11/13	36:02.3	36:13.9	0:00:11	chat	fruitloops	and h is just completely unrestriced
77	3/11/13	36:21.3	36:30.8	0:00:09	chat	cornflakes	yeah it probably wasnt built on anything
	3/11/13	36:23.3	36:26.4	0:00:03	awareness	cheerios	[fully erased the chat message]

	3/11/13	36:23.3	36:26.4	0:00:03	awareness	cheerios	[fully erased the chat message]
78	3/11/13	36:26.9	36:31.7	0:00:04	chat	cheerios	agreed
79	3/11/13	36:36.2	36:37.6	0:00:01	chat	fruitloops	agreed
80	3/11/13	36:38.5	36:55.4	0:00:16	chat	fruitloops	so h was probably the first point constructed in building the shape
	3/11/13	36:54.1	37:02.3	0:00:08	awareness	cheerios	[fully erased the chat message]
81	3/11/13	37:03.1	37:05.9	0:00:02	chat	cheerios	yeah
	3/11/13	37:06.4	37:09.8	0:00:03	awareness	cheerios	[fully erased the chat message]
	3/11/13	37:09.4	37:20.7	0:00:11	awareness	fruitloops	[fully erased the chat message]
	3/11/13	37:11.3	37:13.4	0:00:02	awareness	cheerios	[fully erased the chat message]
82	3/11/13	37:11.5	37:14.9	0:00:03	chat	cornflakes	whatb do you mean?
					chat	fruitloops	well if h can move anywhere it was probably made first cause if you just put a random point anywhere it is the same dark blue color as h and it can move anywhere
83	3/11/13	37:21.4	38:16.7	0:00:55			
	3/11/13	37:24.4	37:25.0	0:00:00	awareness	cheerios	[fully erased the chat message]
84	3/11/13	37:25.2	37:33.2	0:00:07	chat	cheerios	the first point plotted?
85	3/11/13	37:41.7	37:51.7	0:00:09	chat	cornflakes	doesnt it go in alphabetical order?
86	3/11/13	38:02.4	38:06.7	0:00:04	chat	cornflakes	efg and then h
	3/11/13	38:03.1	38:10.5	0:00:07	awareness	cheerios	[fully erased the chat message]
87	3/11/13	38:28.9	38:45.0	0:00:16	chat	cornflakes	but e and f are the same color>>>>>>>>>
88	3/11/13	38:51.1	39:02.3	0:00:11	chat	fruitloops	but e and f are constrained..
89	3/11/13	39:06.0	39:14.6	0:00:08	chat	fruitloops	i dont know for sure maybe youre right
90	3/11/13	39:51.6	39:57.6	0:00:05	chat	cheerios	im not very sure either
91	3/11/13	40:00.5	40:02.4	0:00:01	chat	cornflakes	meneither
92	3/11/13	40:11.6	40:19.3	0:00:07	chat	cheerios	can i do the next polygon
93	3/11/13	40:15.2	40:21.9	0:00:06	chat	fruitloops	should we move on or??

The VMT trilogy



Group Cognition (2006)



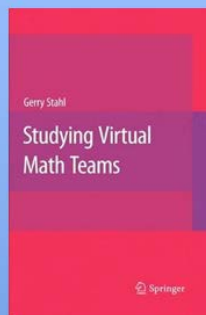
Computer Support for Building Collaborative Knowledge

MIT Press, 510 pages
Available for Kindle

The theory of group cognition emerges from several studies of CSCL and CSCW technologies. Analysis of interaction. Theory of CSCL.

www.GerryStahl.net/elibrary/gc

Studying Virtual Math Teams (2009)

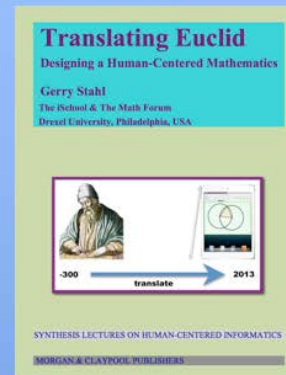


Springer Press, 626 pages
CSCL Book Series, paperback

Studies of the VMT Project technology, pedagogy, analysis, theory by team members and international collaborators

www.GerryStahl.net/elibrary/svmt

Translating Euclid (2013)



Creating a Human-Centered Mathematics

Morgan Claypool Publishers, 325 pages, e-book & paperback

Latest results of this design-based CSCL research from many perspectives.

www.GerryStahl.net/elibrary/euclid

For further info...

Email:

- Gerry@GerryStahl.net

Website:

www.GerryStahl.net

Topics in Dynamic Geometry for VMT:

www.GerryStahl.net/elibrary/topics

Translating Euclid:

- www.GerryStahl.net/elibrary/euclid

Studying Virtual Math Teams:

www.GerryStahl.net/elibrary/svmt

Group Cognition:

- www.GerryStahl.net/elibrary/gc

Slides:

- www.GerryStahl.net/pub/didactics.pdf
www.GerryStahl.net/pub/designing.pdf
www.GerryStahl.net/pub/analyzing.pdf

