The ORC Equations

Curtis C. Chen (curtis@snout.org)

December 3, 2009

Summary

ORC sessions should be broken into hour-long segments. Sign-up sheets should provide slots for 4 participants and 2 waiting list names in each hour. Readings should be limited to 5 minutes, and individual critiques to 2 minutes (if more than 4 people in the room, 1 minute each). Any extra time can be used for group discussion.

http://orycon.org/orycon31/writers/orc.php

Open Read & Critiques (ORCs) have this format:

> For the number of people in the room *n*,
> each person reads for a number of minutes *R*.
> Then the other people each give their critique for a number of minutes *C*;
> this is followed by a brief discussion period of *D* minutes.

(The discussion period *D* is provided so authors can respond to critiques or questions; only one person may speak during each reading *R* and critique *C*.)

Thus the time *t* required to critique one piece is:

$$t = R + (n - 1)C + D$$

And the time *T* required to complete all critiques is:

$$T = nt$$
$$T = n(R + (n - 1)C + D)$$

The guidelines inherited from OryCon 30 specified a maximum of *R*=10 and *C*=5. However, previous ORC sessions were held late at night, with no set end time.

R will always be constant and dependent on the length of readings permitted. In practice, we observed that **no reading ever took more than 5 minutes.** Participants limited their pieces to 750 words or fewer: that's roughly 3 manuscript pages (12-point Courier font, double-spaced, with 1-inch margins, on 8.5"x11" letter-sized paper).

No individual critique *C* ever took more than 3 minutes, and most were around 2 minutes. Toward the end of Saturday's session, we reduced the time limit for critiques to C=1, with no appreciable decline in quality.

D can be adjusted for various factors; however, it should never be the case that $D \geq R$, and we recommend $D = C$ in most cases, unless $C = 1$, in which case $D = C + 1$ to maintain the proportion $R > D \geq C$.

Given $D = C$, we can simplify our equation for T:

$$T = n(R + (n-1)C + C)$$
$$T = n(R + nC - C + C)$$
$$T = n(R + nC)$$
$$T = nR + n^2C$$

Suppose we have a set amount of time for ORCs and wish to know how many participants can get their pieces critiqued in this time. Solving the above equation for n:

$$nR + n^2C = T$$
$$n^2C = T - nR$$
$$n^2 = \frac{T - nR}{C}$$
$$n = \sqrt{\frac{T - nR}{C}}$$

Since we can substitute numbers for all terms but n, we rewrite this expression as:

$$n = \sqrt{\frac{T}{C} - \frac{R}{C}n}$$

Using our observed maximums of R=5 and C=3, and using T=60, to determine how many ORCs we can complete in one hour:

$$n = \sqrt{\frac{60}{3} - \frac{5}{3}n}$$
$$n = \sqrt{20 - \frac{5}{3}n}$$

We see that C is a critical term, as it determines the largest value in the square root. In this example, we get $n \approx 3.7$, which agrees with observed data at OryCon 31; on Friday, we finished

5 critiques in less than 2 hours (after starting 15-20 minutes late). On Saturday, however, 3 hours was not enough; 13 people signed up, 11 showed up, and we finished 9 critiques.

Since we observed most critiques taking 2 minutes on average, let's try *C*=2:

$$n = \sqrt{\frac{T}{C} - \frac{R}{C}n}$$
$$n = \sqrt{\frac{60}{2} - \frac{5}{2}n}$$
$$n = \sqrt{30 - \frac{5}{2}n}$$
$$n = \sqrt{30 - 2.5n}$$

To simplify our starting approximation *a*, we can set *n*=1 on the right side of the equation:

$$a = \sqrt{30 - 2.5}$$
$$a = \sqrt{27.5}$$
$$a \approx 5.2$$

Obviously $a \neq n$ in this approximation, and using larger values of *n* will reduce the value of *a*; we can safely say that $a > n$. Through trial and error, we deduce that $n \approx 4.4$.

Does that work? Let's check the time for one critique:

$$t = R + nC$$
$$t = 5 + (4)(2)$$
$$t = 5 + 8$$
$$t = 13$$

That gives $T = nt = (4)(13) = 52$, which works.

What if we want to accommodate more people in the same time period? We observed on Saturday that setting *C*=1 was feasible. However, since more people will be talking during the discussion period, we want to keep *D*=2.

So we change the expression back to its original form and solve for *n*:

$$T = n(R + (n-1)C + D)$$
$$T = n(R + nC - C + D)$$
$$T = nR + n^2C - nC + nD$$
$$T - nR + nC - nD = n^2C$$

$$T - n(R - C + D) = n^2 C$$

$$\frac{T - n(R - C + D)}{C} = n^2$$

$$\sqrt{\frac{T - n(R - C + D)}{C}} = n$$

$$\sqrt{\frac{T}{C} - \left(\frac{R - C + D}{C}\right) n} = n$$

$$\sqrt{\frac{T}{C} - \left(\frac{R + D - C}{C}\right) n} = n$$

$$\sqrt{\frac{T}{C} - \left(\frac{R + D}{C} - \frac{C}{C}\right) n} = n$$

$$\sqrt{\frac{T}{C} - \left(\frac{R + D}{C} - 1\right) n} = n$$

Now we plug in the numbers:

$$n = \sqrt{\frac{T}{C} - \left(\frac{R + D}{C} - 1\right) n}$$

$$n = \sqrt{\frac{60}{1} - \left(\frac{5 + 2}{1} - 1\right) n}$$

$$n = \sqrt{60 - (7 - 1)n}$$

$$n = \sqrt{60 - 6n}$$

Again, we approximate by setting *n*=1:

$$a = \sqrt{60 - 6}$$

$$a = \sqrt{54}$$

$$a \approx 7.3$$

As before, $a > n$, and we plug in smaller numbers to converge on $n \approx 5.3$.

Sanity check:

$$t = R + (n - 1)C + D$$

$$t = 5 + (5 - 1)1 + 2$$

$$t = 5 + 4 + 2$$

$$t = 11$$

That gives $T = nt = (5)(11) = 55$, which also works.

We can therefore guarantee that 4 people get critiqued within one hour. We can offer a waiting list on the sign-up sheet, just in case one or more of the participants can't attend for some reason, but we should not expect more than 1 absence per hour.

Having said all that, we didn't really need to go through all this. We could have just estimated using the simple equation for t, and intuited that 4 people per hour was about right. But now that we've done the math and documented it, others can use this to run their own ORCs at other conventions with the confidence that it will work.

Also, the iPhone's built-in timer app is very handy, because it's easy to change the time increment and start or stop quickly. I like the "duck" sound, myself.

###