e. A quasi-empirical Cosmological Argument from Causation modesty proposed by one of the co-authors of this syllabus (RCN)

(1) Statement of the Argument:

Let C = a cause and E = its effect, measured (say) in units of energy.
If C <= E (if C is less than or equal to E), then C and E are unlike any causes or effects we know empirically.
Therefore, let C > E (let C be greater than E) so that C = E + e, where e > 0.

Now suppose we have a series of causes, each one acting to produce the next, such that

$C_n \dashrightarrow C_{n+1}$ at time t = n + 1.

Define t = 0 when the series has just run down,

i.e., $C_0 = 0$.

Then $C_{-1} = e$ at time t = -1;

$C_{-2} = 2e$ at time t = -2;

. .
. .
. .

$C_{-n} = ne$ at time t = -n.

As we go backward in time further and further,

C_{-n} --> infinity as time t = -n --> minus infinity,

no matter how small e is.

Under these conditions, it is obvious that an infinite cause is needed to start a causal chain that will endure for an infinite span of time.

(2) Some Possible Objections

(a) Maybe the universe is this infinite cause. Not likely. There is evidence that the visible universe arose at the big bang, a finite time in the past. Besides, an object of finite energy-density spread over an infinite extent of space will run down in a finite time.