```
In[196]:= (*The Rabin
            example:  ten units of stress on April 14 vs. 11 units of stress on April 15.*)
          Clear[r];
          r = 0;
          delta = 1 / (1 + r);
          (*Decide on Feb. 1, 73/74 days in advance.  The traditional method.*)
          pv14 = -10 * (delta^74)
          pv15 = -11 * (delta^75)
          (*The traditional method on the 14 th of April.*)
          pvn14 = -10 * (delta^0)
          pvn15 = -11 * (delta^1)

Out[199]= -10

Out[200]= -11

Out[201]= -10

Out[202]= -11

In[190]:=
          Clear[beta];
          beta = 0.8;
          (*The phelps/pollack method, feb. 1*)
          pp14 = -10 * beta * (delta^74)
          pp15 = -11 * beta * (delta^75)
          (*The phelps/pollack method, April 14*)
          pp14 = -10
          pp15 = -11 * beta * (delta)

Out[192]= -8.

Out[193]= -8.8

Out[194]= -10

Out[195]= -8.8

        (*Looking at non-exponential discounting, using the same example as last semester.*)
        p1 = {50, 50, 50, 50};
        p2 = {25, 25, 75, 85};
```

In[8]:=

```
(*In order to find the present discouted value of each stream,
 we discount each term for the appropriate number of years,
 then add up all of the discounted values.  Thus,
 for each stream of payments, the present discounted value would be:*)
Clear[r];
delta = 1 / (1 + r);
pvp1 = Sum[p1[[i]] / ( (1 + r) ^ i), {i, 1, Length[p1]}]
(*How would our answers change if we use Phelps and Pollack's time-
  inconsistent discounting method?*)
pp1 = (delta * p1[[1]]) + (beta * (Sum[p1[[i]] / ( (1 + r) ^ i), {i, 2, Length[p1]}]))
(*Back to the regular method with the second stream of payments*)
pvp2 = Sum[p2[[i]] / ( (1 + r) ^ i), {i, 1, Length[p2]}]
pp2 = (delta * p2[[1]]) + (beta * (Sum[p2[[i]] / ( (1 + r) ^ i), {i, 2, Length[p1]}]))
```

Out[10]= $\frac{50}{(1+r)^4} + \frac{50}{(1+r)^3} + \frac{50}{(1+r)^2} + \frac{50}{1+r}$

Out[11]= $\frac{50}{1+r} + \text{beta}\left(\frac{50}{(1+r)^4} + \frac{50}{(1+r)^3} + \frac{50}{(1+r)^2}\right)$

Out[12]= $\frac{85}{(1+r)^4} + \frac{75}{(1+r)^3} + \frac{25}{(1+r)^2} + \frac{25}{1+r}$

Out[13]= $\frac{25}{1+r} + \text{beta}\left(\frac{85}{(1+r)^4} + \frac{75}{(1+r)^3} + \frac{25}{(1+r)^2}\right)$

```
(*With a relatively high discount rate, project 1 would be prefered
  But it appears to me (and we would need to test this formally) that the
  differences between the two options don't increase as beta increases.*)
r = 0.10;
beta = 0.9;
pvp1
pp1
N[pp1 / pvp1]
pvp2
pp2
N[pp2 / pvp2]
```

Out[57]= 158.493

Out[58]= 113.278

Out[59]= 0.714717

Out[60]= 157.793

Out[61]= 103.767

Out[62]= 0.657613

```
(*With a relatively low discount rate, project two would be prefered for
  the traditional discouting method.  Can you explain this as well?  Also
  notice that the preference for projects reverses as beta decreases from
  0.9 to 0.8.  So a higher beta acts like a higher discount rate in this
  case.  (Not surprising since payment stream 2 has more payments in the future.)*)
r = 0.05;
beta = 0.9;
pvp1
pp1
N[pp1 / pvp1]
pvp2
pp2
N[pp2 / pvp2]
```

```
Out[113]= 177.298

Out[114]= 151.362

Out[115]= 0.853717

Out[116]= 181.203

Out[117]= 149.724

Out[118]= 0.826279
```

```
(*Notice that at a zero discount rate,
 project two would always be prefered under traditional discounting,
 as the total of the stream of payments is larger.  But for a beta value of 0.7,
 project 1 is prefered.*)
r = 0;
beta = 0.7;
pvp1
pp1
N[pp1 / pvp1]
pvp2
pp2
N[pp2 / pvp2]
```

```
Out[137]= 200

Out[138]= 155.

Out[139]= 0.775

Out[140]= 210

Out[141]= 154.5

Out[142]= 0.735714
```