Programming Proverbs

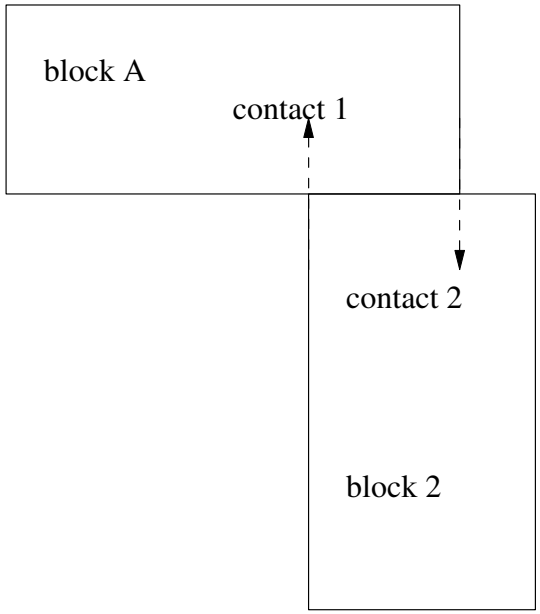
- 25 Consider another language
- 26 Don’t be afraid to start over
- Henry F. Ledgard, “Programming Proverbs: Principles of Good Programming with Numerous Examples to Improve Programming Style and Proficiency”, (Hayden Computer Programming Series), Hayden Book Company, 1st edition, ISBN-13: 978-0810455221, December 1975.

Contact resolution

- so far in PGE we have looked at collision prediction and collision response

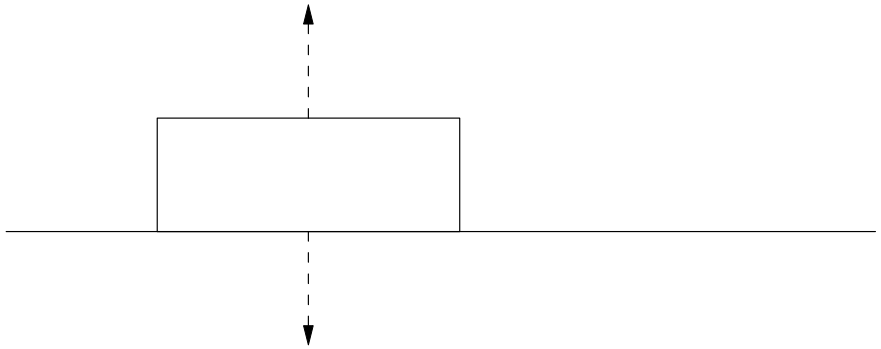
- we notice that while this works well when objects are moving it *breaks* when objects come to rest
  - as objects often interpenetrate

Consider various contact problems: simultaneous contacts



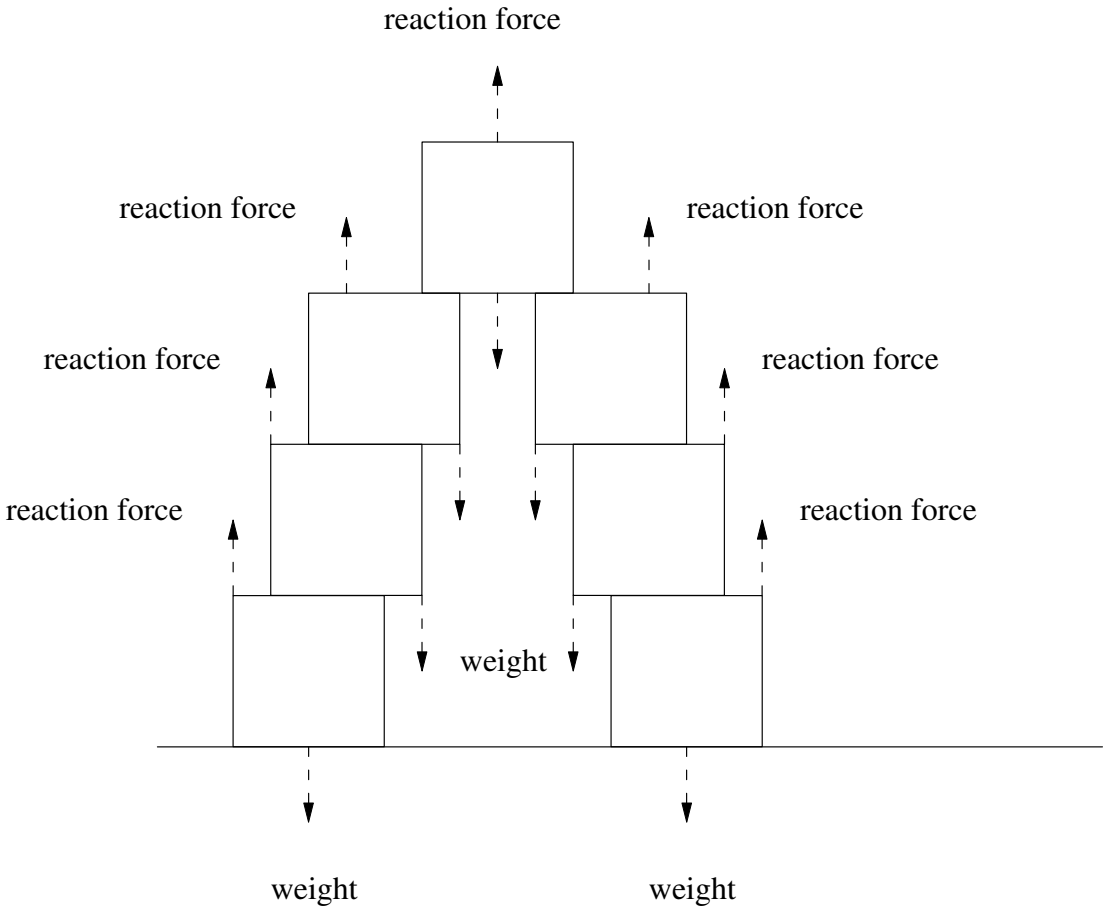
Consider various contact problems: object at rest

reaction force keeping it stationary



weight pulling block through surface

Consider various contact problems: multiple stacked objects at rest



Resolution order

- if an object has two simultaneous contacts then
- changing one of the contacts by reversing its velocity, as a reaction, might also change the reaction of the other
  - as the object moves appart
  - or it might not be enough as the other contact velocity might be larger
- to avoid this situation we resolve the most severe contact first

Resolution order

- another problem might be that resolving the second contact puts the first contact back into conflict

- fortunately it can be shown that non friction cases the looping will eventually settle to the correct answer
  - it will also work for certain friction cases

Contact resolver algorithm

```
repeat
   calculate the separating velocity of each contact, keeping track
       of the contact with the lowest value

   if the lowest separating velocity is greater than or equal to zero
   then
      return
   else
      process the collision response algorithm for the contact with
          the lowest separating velocity (most negative)
   fi
until max iterations have occurred
```

Contact resolver algorithm

- max number of iterations must be ≥ of contacts
  - so that they all have a chance of being processed once