```
(w, x, y, z) = (Input(Z), Input(Z), Input(Z), Input(Z))
While  w > 0  and  x > 0  and  y > 0  and  z > 0
        control  =  Input(1, 2, 3, 4)
        if  control  ==  1  then
                (w, x , y , z )=(x+1,y+2,z+3,w−7)
        else
        if  control  ==  2  then
                (w, x , y , z )=(x+2,y+4,z−7,w)
        else
        if  control  ==  3  then
                (w, x , y , z )=(x−1,y−2,z−3,w+5)
```

HW 10 CMSC 389. DUE Jan 21
WARNING- THIS HW IS TWO PAGES LONG.

1. (0 points) What is your name? Write it clearly. Staple your HW. When is the final? Are you free then? (if not then SEE ME IMMEDIATELY)

2. (30 points) Prove the program on the top of this page program terminates. (HINT: this does not require Ramsey Theory or Fancy orderings.)

3. (30 points) Prove the program on the next page terminates using Ramsey Theory.

```
(w, x, y, z) = (Input(Z), Input(Z), Input(Z), Input(Z))
While  w > 0  and  x > 0  and  y > 0  and  z > 0
        control  =  Input(1, 2, 3, 4)
        if  control  ==  1  then
                w  =  Input(Z)
                x  =  Input(Z)
                y  =  Input(Z)
                z  =  z−1
        else
        if  control  ==  2  then
                w  =  w−1
                x  =  Input(Z)
                y  =  Input(Z)
        else
        if  control  ==  3  then
                x  =  x−1
                y  =  Input(Z)
        else
        if  control  ==  4  then
                y  =  y−1
```