#include<stdio.h>

int main()

{

int available[3],work[5],max[5][3],allocation[5][3],need[5][3],safe[5],totalres[5];

char finish[5];

int i,j,k,totalloc=0,state,value=0; //\* loop variables,value is safe sequence array

printf("Enter Instances of each Resource:");

for(i=0;i<3;i++)

{

scanf("%d",&totalres[i]);

}

printf("Enter Maximum resources for each process:");

for(i=0;i<5;i++) //\*outer most for loop is for proceses

{

for(j=0;j<3;j++) //\* inner most for loop is for resource types

{

printf("\n Enter process %d Resource %d:",i,(j+1));

scanf("%d",&max[i][j]);

}

}

printf("Enter number of resources allocated to each process:");

for(i=0;i<5;i++)

{

for(j=0;j<3;j++)

{

printf("\n Enter the resources of R%d aloocated to process %d:",(j+1),i);

scanf("%d",&allocation[i][j]);

}

}

for(i=0;i<5;i++)

{

for(j=0;j<3;j++)

{

need[i][j]=max[i][j]-allocation[i][j];

}

}

for(i=0;i<5;i++)

{

finish[i]='f';

}

for(i=0;i<3;i++)

{

totalloc=0;

for(j=0;j<5;j++)

{

totalloc=totalloc+allocation[j][i];

}

available[i]=totalres[i]-totalloc;

work[i]=available[i];

}

printf("\n Allocated Resources\n");

for(i=0;i<5;i++)

{

for(j=0;j<3;j++)

{

printf ("%d",allocation[i][j]);

}

printf("\n");

}

printf("\n Maximum Resources \n");

for(i=0;i<5;i++)

{

for(j=0;j<3;j++)

{

printf("%d",max[i][j]);

}

printf("\n");

}

printf("\n Needed Resorces\n");

for(i=0;i<5;i++)

{

for(j=0;j<3;j++)

{

printf ("%d",need[i][j]);

}

printf("\n");

}

printf("\n Available Resources");

for(i=0;i<3;i++)

{

printf("%d",available[i]);

}

printf("\n");

for(i=0;i<5;i++)

{

for(j=0;j<3;j++)

{

if((finish[i]=='f')&&(need[i][j]<=work[j]))

{

state=1;

}

else

{

state=0;

break;

}

} //end of innermost loop

if(state==1)

{

for(j=0;j<3;j++)

{

work[j]=work[j]+allocation[i][j];

}

finish[i]='t';

safe[value]=i;

++value;

}

if(i==4)

{

if(value==5)

{

break;

}

else

{

i=-1;

}

}

}//end of outermost loop

printf("\n safe states are");

for(i=0;i<5;i++)

{

printf("P%d",safe[i]);

}

return 0;

}