% Problem Instance

% types of actions

action\_type(observe). action\_type(downlink). action\_type(uplink).

% available actions order

action(7,observe).

action(8,observe).

action(1,observe).

action(2,downlink).

action(3,observe).

action(4,observe).

action(5,uplink).

action(6,downlink).

action(9,uplink).

% visibility of task i on orbit j (decision variable)

visible(1,1,1).

visible(2,1,1).

visible(3,1,1).

visible(4,1,1).

visible(5,1,1).

visible(6,1,1).

visible(7,1,1).

visible(8,1,1).

visible(9,1,1).

% emergency tasks

emergency\_task(1).

% task priorities

priority(1,2). priority(3,2). priority(4,1). priority(7,3). priority(8,1).

% action time window - available execution time

% satellite can take action i between minutes k to i

action\_window(1,1,4).

action\_window(2,5,7).

action\_window(3,7,10).

action\_window(4,8,10).

action\_window(5,11,14).

action\_window(6,20,23).

action\_window(7,32,35).

action\_window(8,32,34).

action\_window(9,35,38).

% orbits

orbit(1).

% satellites

satellite(1,aqua).

% satellite action time consuming

sat\_action\_time(1, observe, 4).

sat\_action\_time(1, downlink, 4).

sat\_action\_time(1, uplink, 4).

% actual memory units busy

sat\_memory(1,0,0).

% memory units available on satellite's i board

memory\_storage(1,30).

% memory units usage by satellite i for each observation task

memory\_use(1,10).

% actual energy units busy

sat\_energy(1,0,200).

% energy units available on satellite's i board

energy\_storage(1,200).

% energy units usage by satellite i for each task

energy\_use(1,20).

% energy units generated by satellite i for each minute

energy\_gen(1,1).

% orbit 2

orbit(2).

satellite(2,hotbird).

sat\_action\_time(2, observe, 2).

sat\_action\_time(2, downlink, 2).

sat\_action\_time(2, uplink, 2).

sat\_memory(2,0,0).

memory\_storage(2,60).

memory\_use(2,20).

sat\_energy(2,0,300).

energy\_storage(2,300).

energy\_use(2,10).

energy\_gen(2,2).

visible(1,2,1).

visible(2,2,1).

visible(3,2,1).

visible(4,2,1).

visible(5,2,1).

visible(6,2,1).

visible(7,2,1).

visible(8,2,1).

visible(9,2,1).