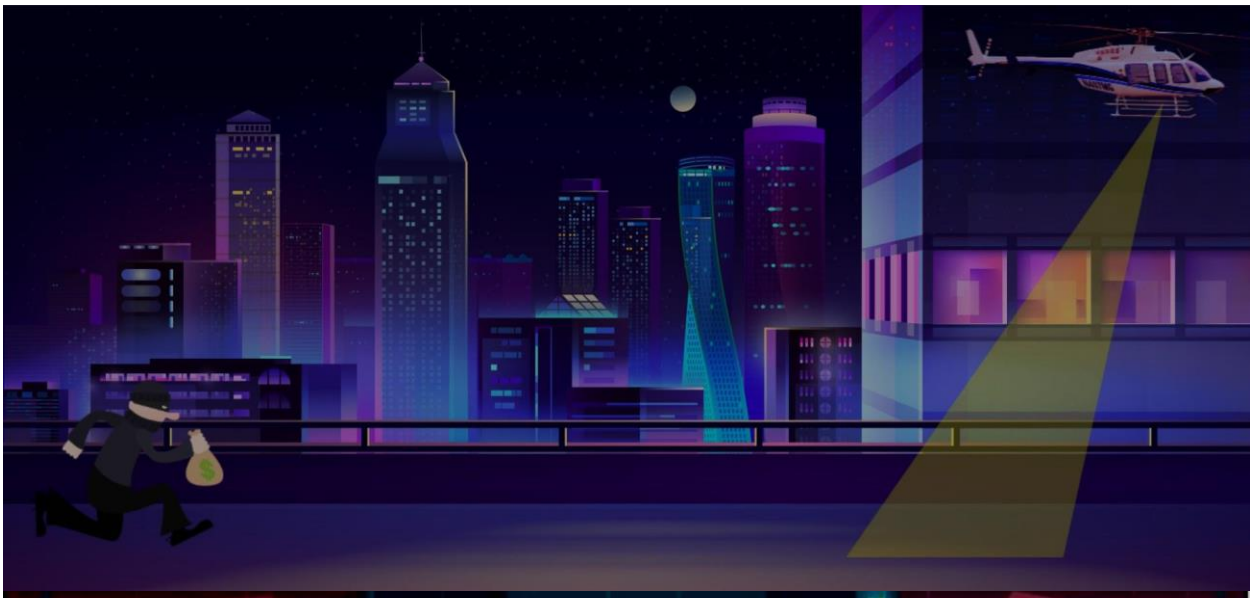


Thief Chase

By

LMU ID 20048281

TABLE OF CONTENTS

Description

The complete scenario comprise of three scenes that manifest the interaction between six agents. The hypothetical scenario depicts an escape attempt of a thief after a bank robbery. The Bank robber attempts to flee police, and there are three challenges thief must complete successfully to reach the end. When the thief 01 fails a task "freeze" and "busted" sound clips are played.

Following is a list of agents and a brief description on how they interact with other agents:

1. Thief 01: - this agent is capable of being controlled through the key board. On the input of right key the agent moves right and on left key press the agent move left. On the last scene this agent upon the press of "A" key disguise as a gentlemen to hide from the police Helicopter.

2. Thief 02:- Thief 02 agent based on a time counter communicates with thief 01. Thief 01 replies accordingly.

3. Police Officer: - actions of the police officer are based on the time counter (daytime or night time) and the coordinates of the thief 01.

4. Police Car: - Police car based on a random number input moves from left to right of the screen.

5. Small Child: - this agent tries to locate the thief 01 using his torch light. Upon the Enter key press light will be directly placed on the agent.

6. Police Helicopter: - Police Helicopter hovers in search of the thief 01. The speed of the police helicopter is based on a random number input.

The First Scene

The hypothetical situation animated is a bank robbery. In the inception of the first scene two robbers runs for the life, while the bank alarm is continuously ringing in the background. After seeing the police officers two thieves may act either as given in the first option below or the second option:

First Option- Thieves may decide to wait till it gets dark, and when the screen gets dark the police officers leave. Once the police officers are not visible the thief can successfully move to the second scene.

Second Option- Thieves may proceed even if it is not dark. If the thief 01 moves forward the police officer will shoot and players will get busted.

The Second Scene

In the inception of the second scene the thief 01, will successfully evade the police moves across the screen in dark. A police vehicle and a small child look for the thief 01. Two possible options are as follows:

First option- Upon pressing enter key the thief 01 image lights up and the light of the torch is shed on the thief 01. This ends the animation.

Second Option- If the Enter key press is not pressed the thief 01 may complete this phrase too.

The Third Scene

The thief 01 reaches the third scene, where police helicopter hovers over the city looking for the thief 01. Agent (thief 01) can behave in two ways.

First option- If the thief 01 moves without any disguise the police helicopter recognizes the thief, when the thief moves across its light.

Second Option- If the thief 01 disguise as a gentleman the thief will be able to successfully move across the screen.

Flow of the scenario

SCENE 01

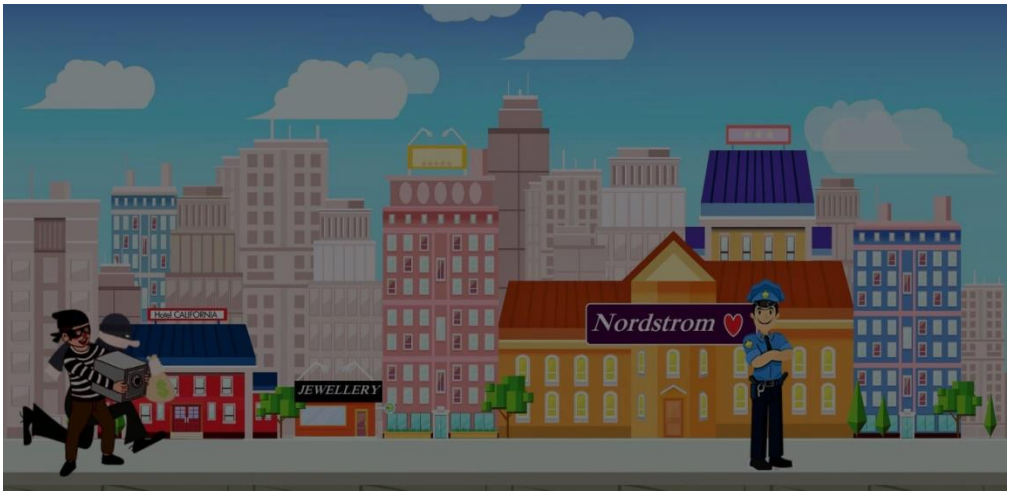
Screenshot 01

Thief 01 and 02

Police officer Image 01

At the inception of the scenario screen contains the above two images. Three PNG images have been used for thee agents. The canvas is equal to the height and width of the screen.

Screenshot 02



A dark rectangle is drawn on the screen with 0.5, opacity in order to give the viewers a night time impression, while its sill possible to see through the dark rectangle.

Screenshot 03

Thief 01 Thief 02 Police Officer Image 02

When the thief 01 passes the x coordinate of 500px. Police officers Image changes to a shooting position. To denote the shooting a yellow colour line is drawn from coordinates officers coordinates to the thief 01 and thief 02 coordinates. And "freeze" and "busted" sound clips are played.

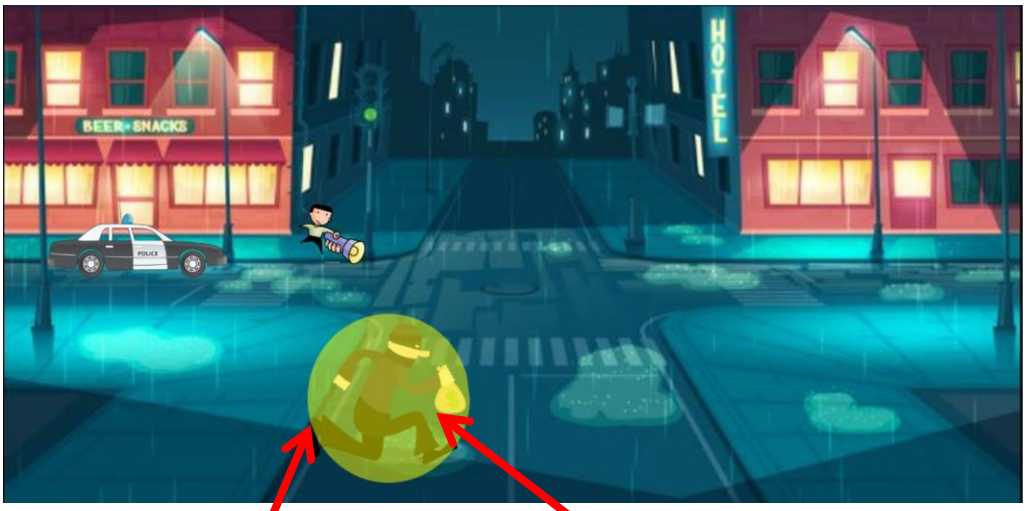
SCENE 02

Screenshot 04

Police car Thief 01 darken Image Small Child Light beams of the torch

On the scene 02, a police car moves from left to right of the screen and there is a small child with a torch in his hand. The Police car, thief 01 and the light moves based on an input of a random number. A circle drawn with a low opacity denotes the light of the torch. Unless the Enter key is not pressed the thief 01 is moved from left to right of the screen.

Screenshot 05



Torch Light Thief 01

The thief 01 image is changed from the darken image to the image shown on the screenshot 05. And the torch's light is placed on the coordinates of the thief. This ends scene and "freeze" and "busted" sound clips are played.

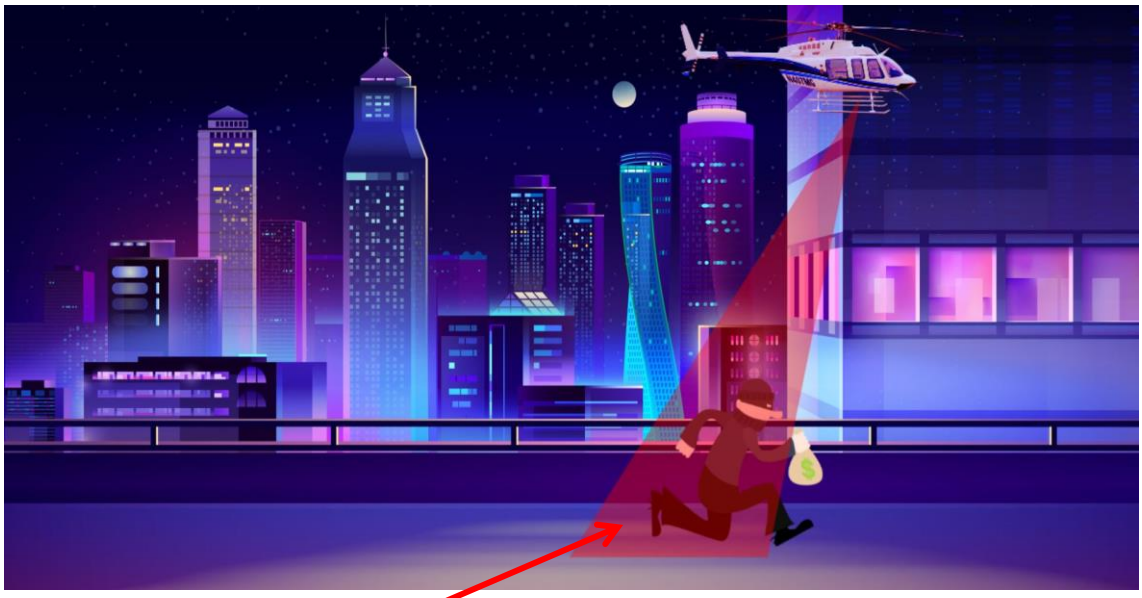
SCENE 03

Screenshot 06

Helicopter Thief 01 Search light

On the scene 03 the helicopter moves from left to right of the screen. A rectangle with low opacity is drawn from the centre coordinates of the helicopter to ground.

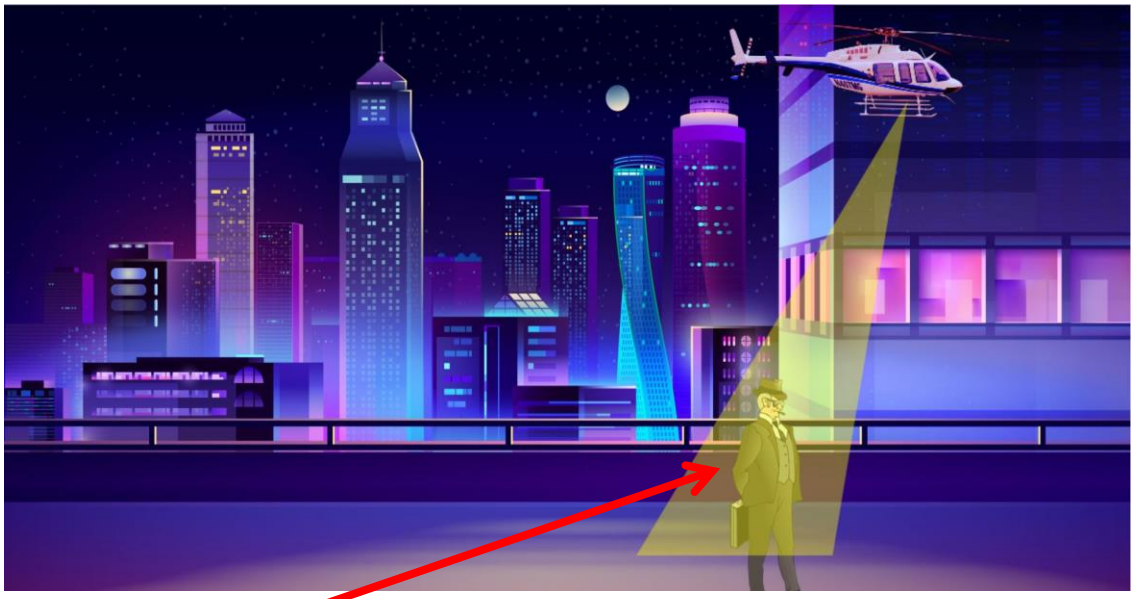
Screenshot 07



Search Light in red colour

When the thief moves across the helicopter search light without disguising as mentioned below the search light becomes red. If the thief 01 crosses the search light beam, in the current status this ends the scene and the “freeze” and “busted” sound clips are played.

Screenshot 08



The thief 01 disguised as a gentleman

Upon the key press of “A” the thief 01 image changes to a new image. If the thief 01 disguised as above and move from left to right of the screen that helps the thief to evade the police search light. If the thief 01 moves from left to right of the screen, that marks the end of the all 03 scenes.

P.E.A.S of the Agents

PEAS, stands for Performance measure, Environment, Actuator, Sensor. The PEAS system delivers the performance measure with respect to the environment, actuators and sensors of the respective agent. Following are the PEAS of the agents.

P.E.A.S for Thief 01

Performance	Running away from the police
Environment	City
Actuators	Running
Sensors	Vision/eyes

P.E.A.S for Thief 02

Performance	Helping the thief 01 to run away from the police
Environment	City
Actuators	Communicating with the thief 01
Sensors	Vision/eyes

P.E.A.S for Police Officer

Performance	Arresting the thieves
Environment	City
Actuators	Shooting at the Thieves
Sensors	Vision/eyes

P.E.A.S for Police Car

Performance	Patrolling on the streets to locate the thief
Environment	city

Actuators	Moving on the road
Sensors	Infrared

P.E.A.S for Small Child

Performance	Looking for the Thief using the torch light
Environment	City
Actuators	Moving the torch
Sensors	Vision/eyes

P.E.A.S for Police Helicopter

Performance	Locating the thief
Environment	City
Actuators	Hovering over the city
Sensors	Infrared

Finite State Transition

State transition diagrams manifests how objects behave- how the state is changed based on a given situation. As all AI agents have a finite set of states, it would be easy to show them in the form of diagrams.

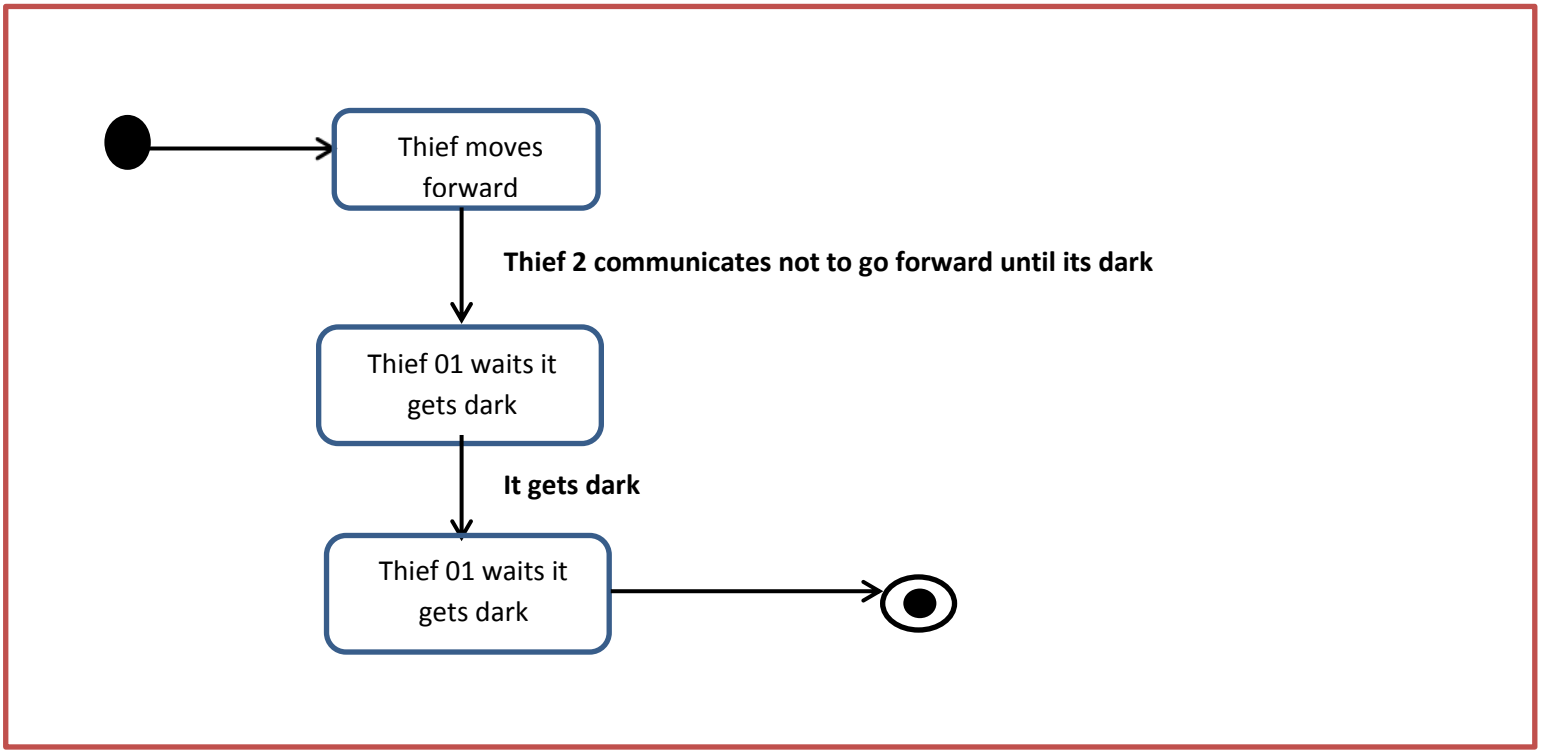
On the artifact in the first scene thief 01 change its status based on the communications received verbally from the thief 02. On the scene 02 the thief 01's state depends on whether the child with a torch light shed light on the thief or not. Also, on the last scene the thief 01's state changes due to the hovering helicopter.

The police officers change its states when the thief 01 enters its visual scope, from the default states changes to a shooting state to shoot the thief 01. Also, when it's dark the policeman goes home.

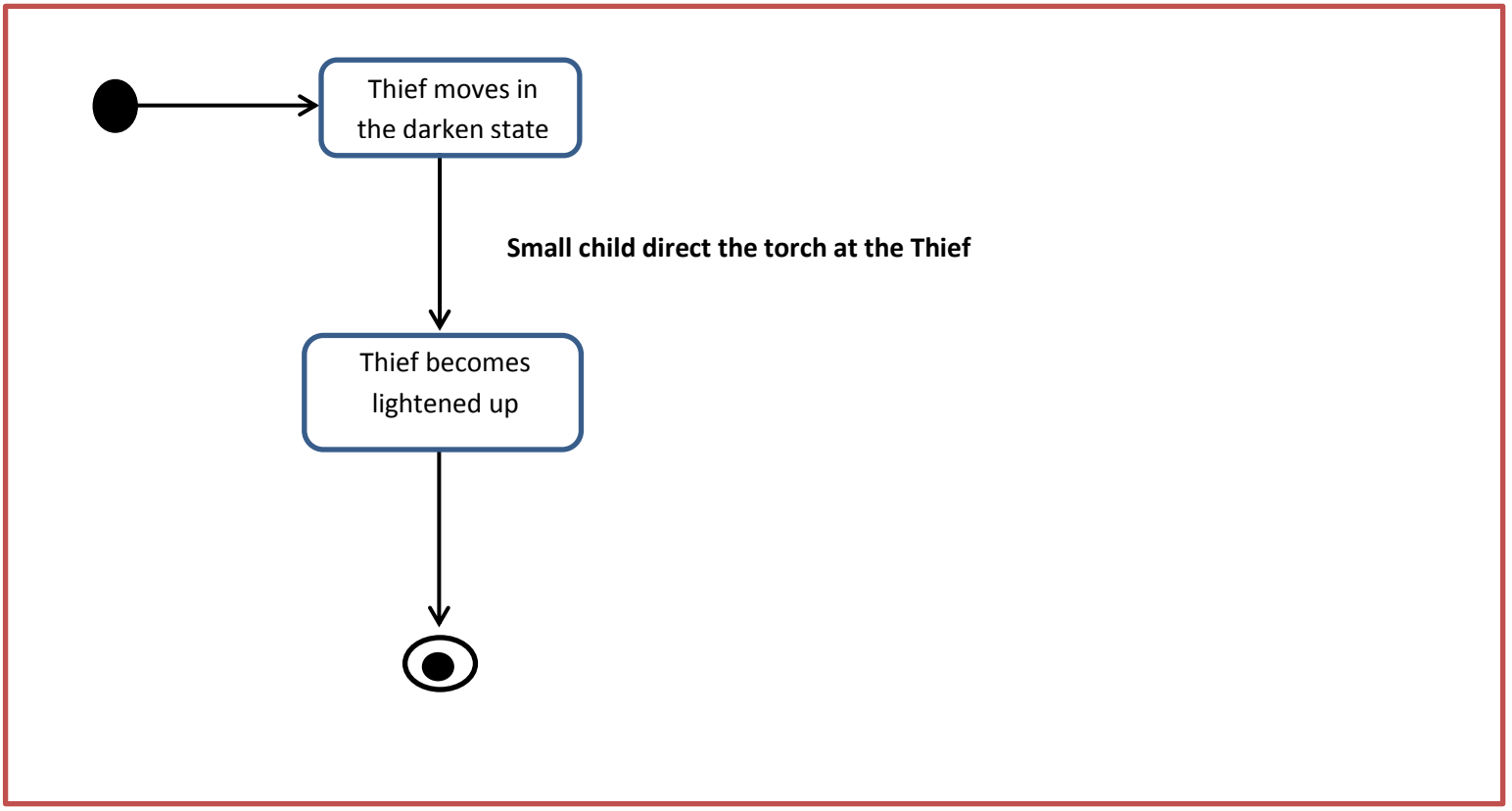
On the scene 02 the child with a torch light, if sees the thief 01 shed the light on thief 01. On the last scene automated helicopter if detects the thief changes its colour to red.

STATE TRANSITION DIAGRAM FOR THIEF 01

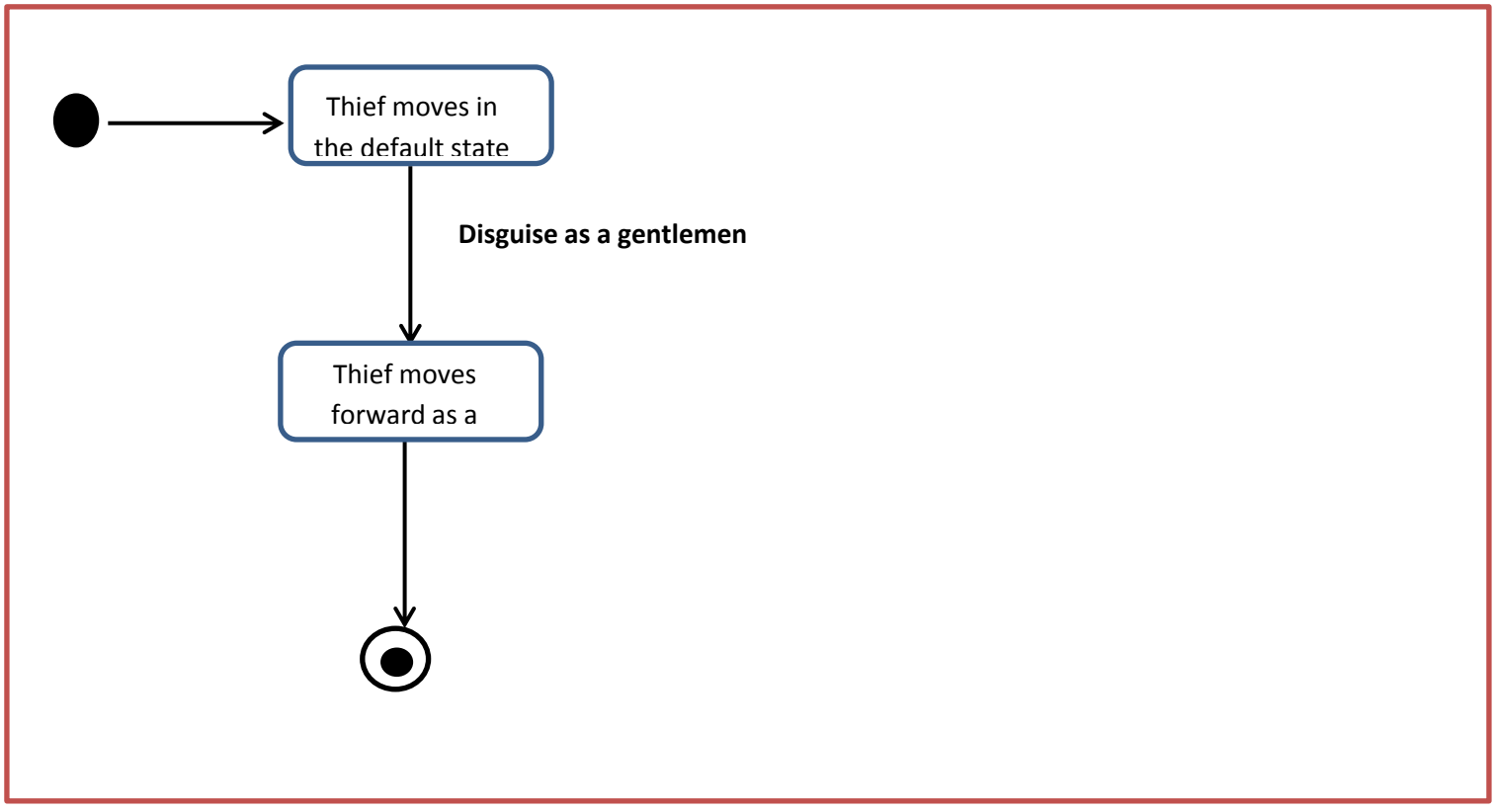
SCENE 01



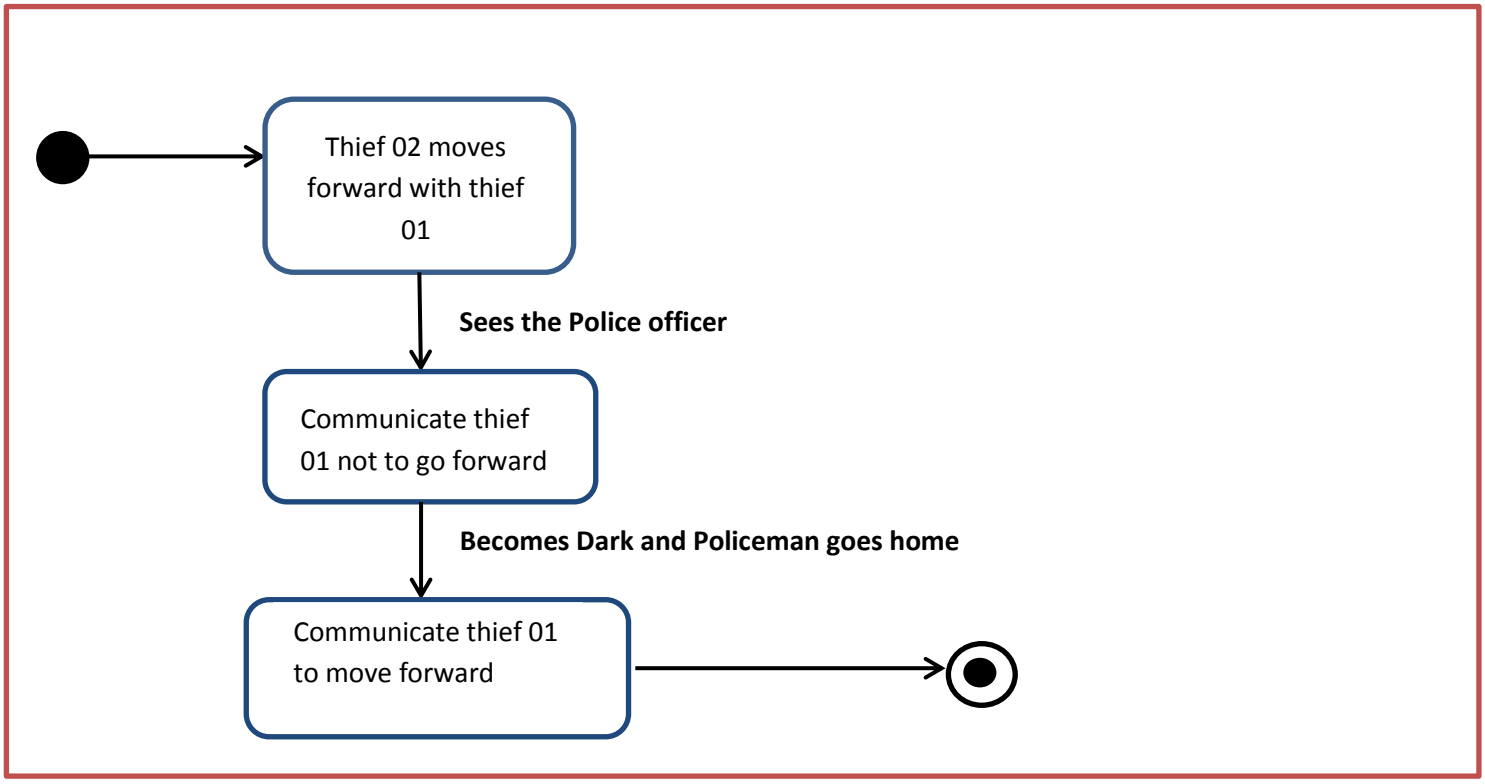
SCENE 02



SCENE 03

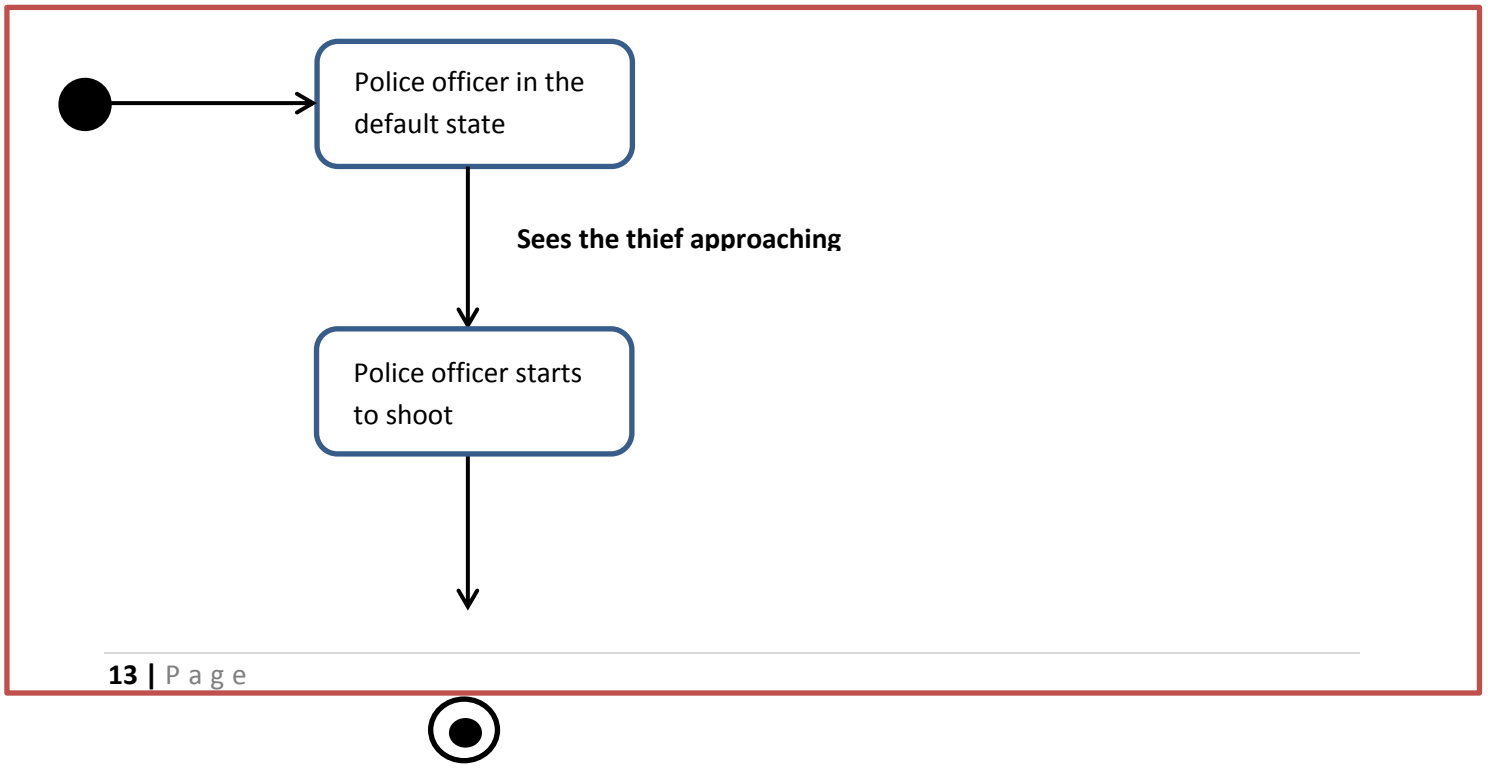


STATE TRANSITION FOR THIEF 02

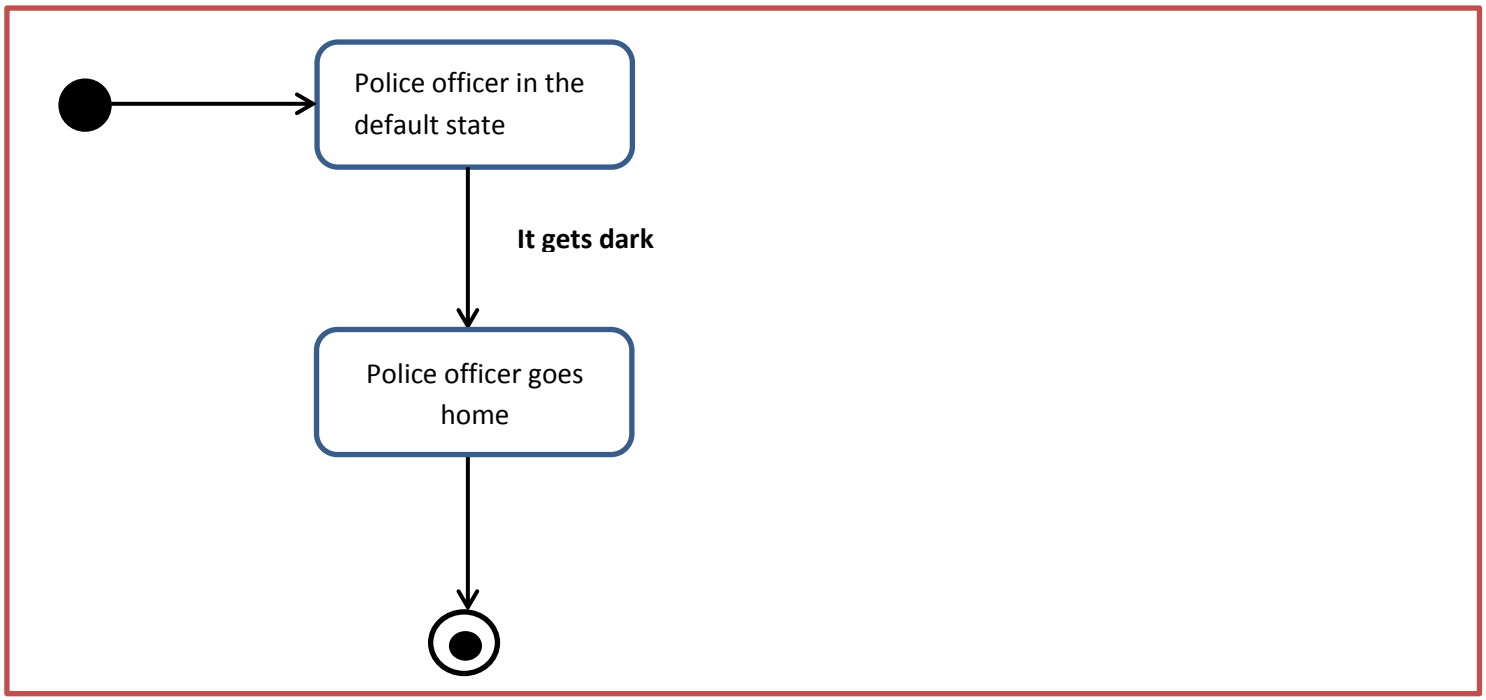


STATE TRANSMITION DIAGRAM FOR POLICE OFFICER

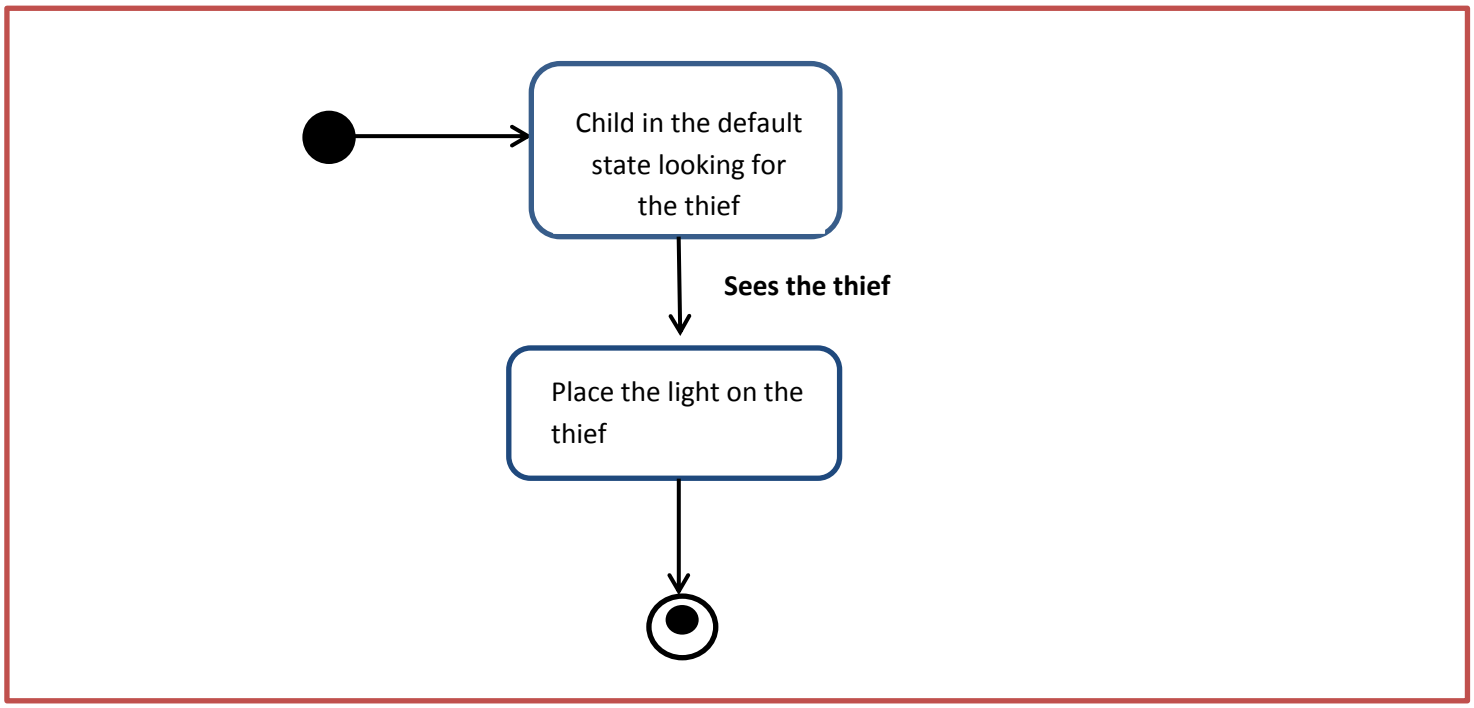
Police Officer – Day Time



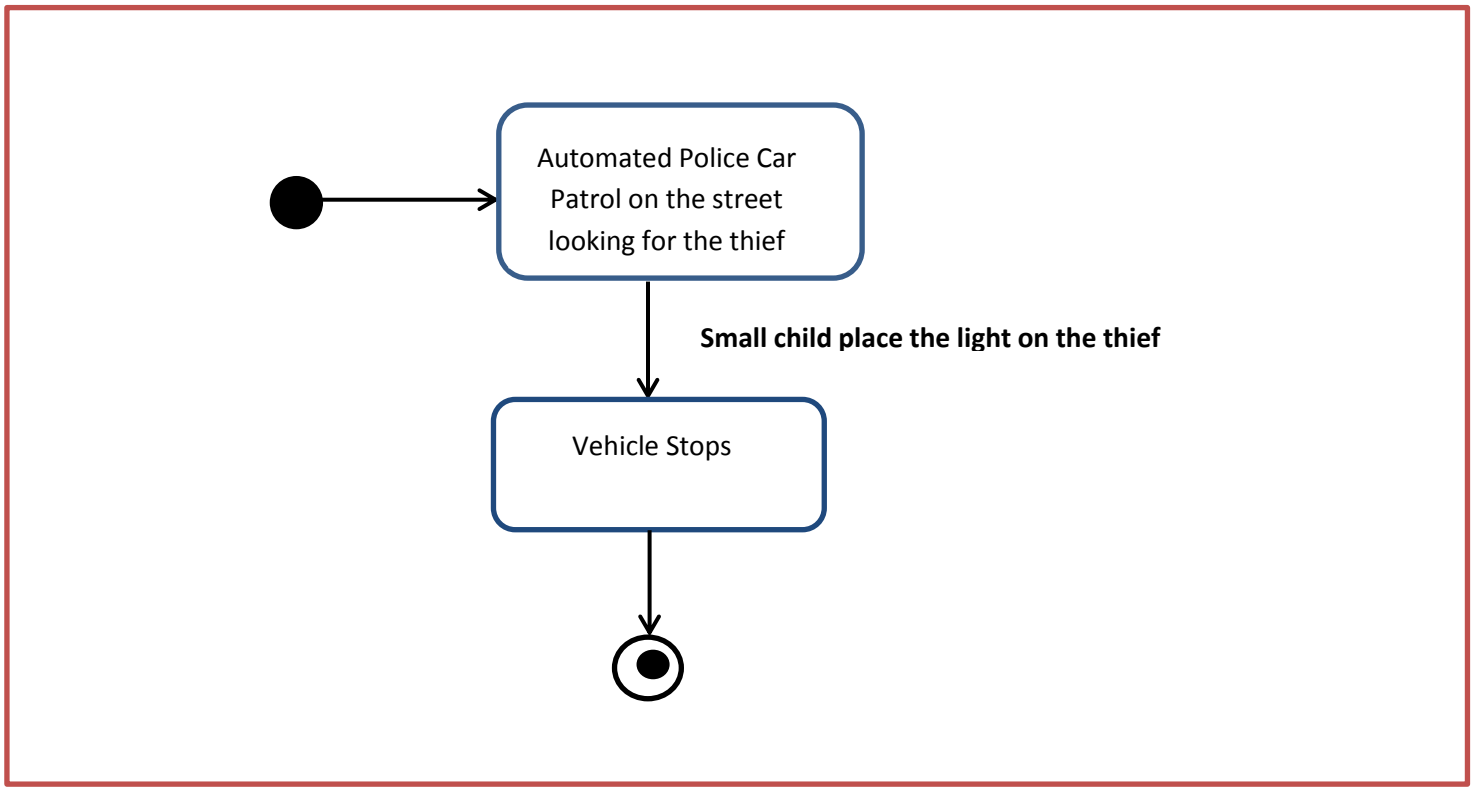
Police Officer –Night Time



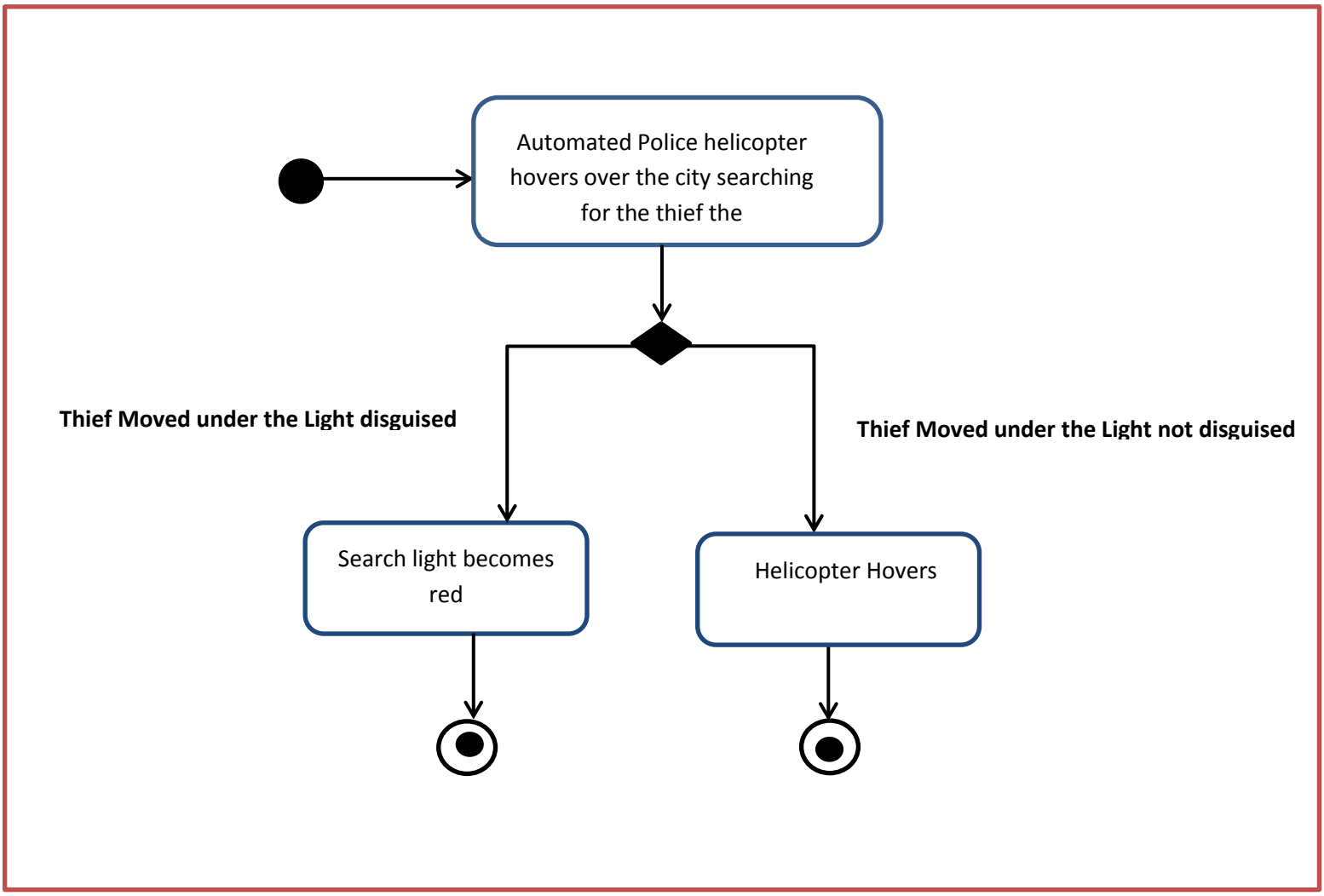
STATE TRANSMITION FOR SMALL CHILD



STATE TRANSITION FOR POLICE VEHICLE



STATE TRANSITION FOR POLICE HELICOPTER



AI FEATURES IMPLEMENTED

01. Verbal Communication

In the scene 01, the thief 02 after seeing the police communicate with the thief 01 and inform him to not to move forward.

```
function conversation (){

    if ((thiefx>150) && (conversationCount<=200) && (timeofday == "Day Time")){
    ctx.drawImage(dialogue1,thief2x+25,thief2y-55);}//displays first dialugue by thief2

    if (((thiefx>150) && (thiefx<490)) && (conversationCount>=350) && (timeofday ==
    "Night Time")) {ctx.drawImage(dialogue3,thief2x+35,thief2y-40);}//displays third
    dialugue by thief1

    if (((thiefx>150 ) &&(thiefx<490) ) && (conversationCount>300) && (timeofday ==
    "Day Time")) {ctx.drawImage(dialogue2,thiefx+25,thiefy-55);}//displays second
    dialugue by thief2}
```

02. Visual Perception

In the scene 01, the Police officer is capable of seeing the approaching thieves, if the thieves are approaching in the daytime, and within the visual ability (scope) of the police officer.

```
function see(){

    if ((thiefx>500) && (thiefx<900) && (timeofday == "Day Time")){
        policeCanSee = true;
      }else{
        policeCanSee = false;}}
```

03. Ability to detect

In the scene 03, police search light can detect the thief if the thief is not disguise as gentlemen.

```
youCanSee=true;

function thief () { ctx.canvas.width  = window.innerWidth;
ctx.canvas.height = window.innerHeight;

var thiefImg= new Image();
```

```
if (65 in keyPress){ thiefImg.src="gent.png"; youCanSee=false;}

else{

   thiefImg.src="thief.png";}

ctx.drawImage (thiefImg, thiefx, thiefy) ; } //draw thief
```

04. Heat Detection

The infrared devices on the helicopter distinguish the thief body temperatures. As the body temperature of a person running is higher it is easy to distinguish a running thief from a crowd.

```
if (Infarred== true) {

   ctx.fillStyle ='rgba(255, 0, 0, 0.4)'

} else {

 ctx.fillStyle ='rgba(255, 255, 0, 0.4)'

}
```

SOURCE CODES

01. First HTML document

```
html>
<head>
</head>

<body>
   <style>
      body {
        background-image: url('background1.jpeg');
        background-repeat: no-repeat;
        background-attachment: fixed;
        background-size: cover;
      }
      </style>
<canvas id='canvas3' > </canvas>
<script src='set1.js'> </script>

</body>
</html>
```

02. JS File

```
window.onload = init();
function init() {
c=document.getElementById("canvas3")
ctx=c.getContext("2d");


//thief1 position
 var thiefx=20;
 var thiefy=370;

//audio  files
var audio1 = new Audio('gunSound.mp3');
audio1.volume = 0.8;

var audio2=new Audio('police.mp3');
audio2.volume = 0.01;

var audio3=new Audio('freeze.mp3');
audio3.volume=0.10;
```

```
var audio4=new Audio('alarm.mp3');
audio4.volume=0.10;

var audio5 = new Audio('busted.mp3');
audio5.volume = 0.8;


//Drawing speech Bubbles
var dialogue1=new Image();
dialogue1.src="speech1.png";

var dialogue2=new Image();
dialogue2.src="speech2.png";

var dialogue3=new Image();
dialogue3.src="speech3.png";


//thief2 position
var thief2x=05;
var thief2y=350;

//police position
var policex=900;
var policey=320;

 //thief function
function thief2 (){
var thief2Img= new Image();
thief2Img.src="thief2.png" ;
ctx.drawImage (thief2Img, thief2x, thief2y) ; }

//thief function
function thief (){
var thiefImg= new Image();
thiefImg.src="thief.png" ;
ctx.drawImage (thiefImg, thiefx, thiefy) ; }

//initialize time of day
timeofday = "Day Time";
```

```
hourcount= 0;

function bankAlarm() {
if (hourcount< 500)
audio4.play();}

function sunormoon() {
     if (hourcount==500) //about 20 seconds
        timeofday = "Night Time";

    if (hourcount==1000)// about 20 seconds
                timeofday= "Day Time"
      }


function dark() {
                    if (timeofday == "Night Time") {
                            ctx.fillStyle = 'rgba(0, 0, 0, 0.5)';
                           ctx.rect(0,0,1700,1700);
                            ctx.fill();}
                           if (timeofday == "Day Time") {
                                        ctx.fillStyle = "transparent";
                                  ctx.rect(0,0,1249,349);
                                        ctx.fill();         } }

function see(){
                if ((thiefx>500) && (thiefx<900) && (timeofday == "Day Time")){
                  policeCanSee = true;
                }else{
                  policeCanSee = false;}}



function shoot () {
                if (policeCanSee==true) //shootig based on the daytime and thief1 position
                shootPlayer();
}


//initialize conversation count
conversationCount=0;
```

```
function conversation (){
                if ((thiefx>150) && (conversationCount<=200) && (timeofday == "Day
Time")){
                ctx.drawImage(dialogue1,thief2x+25,thief2y-55);}//displays first dialugue
by thief2
                if (((thiefx>150) && (thiefx<490)) && (conversationCount>=350) &&
(timeofday == "Night Time")) {
                 ctx.drawImage(dialogue3,thief2x+35,thief2y-40);}//displays third
dialugue by thief1
                if (((thiefx>150 ) &&(thiefx<490) ) && (conversationCount>300) &&
(timeofday == "Day Time")) {
                 ctx.drawImage(dialogue2,thiefx+25,thiefy-55);}//displays third dialugue
by thief1
                }


function shootPlayer()
                 {
                 ctx.lineWidth = 5;
                 ctx.strokeStyle = 'yellow';
                 ctx.beginPath();
                 ctx.moveTo(932,370);
                 ctx.lineTo(thiefx,thiefy);
                 ctx.stroke();
                 ctx.moveTo(932,370);
                 ctx.lineTo(thief2x,thief2y);
                 ctx.stroke();
                   audio5.play ();
      audio3.play();
                 audio1.play();
                 audio2.play();  }


//police function
function police() {
var policeImg=new Image();
ctx.canvas.width  = window.innerWidth;
ctx.canvas.height = window.innerHeight;
policeShoot=false;

if ((thiefx>500) && (thiefx<900) && (timeofday == "Day Time")){
```

```
                policeShoot = true;}
                else{
                policeShoot = false;}

if ((thiefx>50) && (timeofday == "Night Time")){
                policePresent = false;}
                else{
                policePresent = true;}

if (policeShoot==true) {
policeImg.src="police2.png";
}if (policeShoot==false){
policeImg.src="police.png"
}
if (policePresent==false){
policeImg.src="";}
ctx.drawImage (policeImg, policex, policey); }


var keyPress={};

 addEventListener("keydown",function(e){
 keyPress[e.keyCode]=true;},false);

 addEventListener("keyup",function(e){
                 delete keyPress[e.keyCode];},false);

 function update(){
                 if(37 in keyPress){
                  thiefx = thiefx - 10;
                 }

                 if(39 in keyPress) {
                  thiefx = thiefx + 10;
                 }
 }

 function nextWindow(){
                if  ((thiefx>999) && (timeofday == "Night Time")) // end of the part1
                window.open("set2.html", "_self") }
```

```
function Loop()
                {
                 console.log("Hello");
                 update();
                 police();
                 thief();
                 conversation();
                  conversationCount= conversationCount+1;
                 sunormoon();
                  hourcount = hourcount+1;
                 thief2();
                 dark();
                 see();
                 shoot();
                 bankAlarm();
                   nextWindow();
                 setTimeout(Loop, 20);
                }
                Loop()
}
```

03. Second HTML File

```
<html>
<body>
    <style>
       body { background-image: url('b.jpg');
       background-repeat: no-repeat;
       background-attachment: fixed;
       background-size: cover;}
   </style>
<canvas id='canvas10' > </canvas>
<script src = "set2.js"></script>
</body>
</html>
```

04. Second JS file

```
window.onload = init();
function init() {

c=document.getElementById("canvas10")
ctx=c.getContext("2d");


//audio clips
var audio5 = new Audio('busted.mp3');
audio5.volume = 0.8;

var audio2=new Audio('police.mp3');
audio2.volume = 0.01;

var audio3=new Audio('freeze.mp3');
audio3.volume=0.10;

var audio6 = new Audio('breath.mp3');
audio6.volume=0.5;


//initiating Thinking Bubble
var dialogue1=new Image();
dialogue1.src="thiefmove.png";

//initiating dialogue 01
var dialogue2=new Image();
dialogue2.src="child1.png";

//initializing police see
policeSee=false;

//thief position
var thiefx=202;
var thiefy=370;


//torch man position
var torchx=360;
var torchy=230;


//circle start
var  x1 = 900 ;
var  y1 = 310;
var SPEED = 1;
```

```
//police position
var policeCarx=20;
var poiceCary=200;
var SPEED = 1;
var carImg= new Image();
carImg.src="policecar.png" ;

//initializing time count
timeCount=0;

function thief () {
ctx.canvas.width  = window.innerWidth;
ctx.canvas.height = window.innerHeight;
var thiefImg= new Image();
if ((policeSee==true) &&  (thiefx<1000)){
thiefImg.src="thief.png" ;
}else{
   thiefImg.src="thiefC.png"}
ctx.drawImage (thiefImg, thiefx, thiefy) ; } //draw thief


function thinking (){
                        if (thiefx<350){
                        ctx.drawImage(dialogue1,thiefx+25,thiefy-55);}//draw dialougue
  }

function torch () {
var torchImg= new Image();
torchImg.src="torch.png" ;
ctx.drawImage (torchImg, torchx, torchy); }


function draw()  {
ctx.beginPath();
if (policeSee==false) {
ctx.arc (x1, y1, 100 , 0 , 6 , false);
}else {
  ctx.arc (thiefx+100, thiefy+90, 100 , 0 , 6 , false)}

ctx.fillStyle ='rgba(255, 255, 0, 0.5)';
ctx.fill(); }

function circleTime () {     //move circle
   x1 = x1 + 1+ SPEED;
   y1=y1+SPEED; }
```

```
function check() {
  var   z = Math.random() * 50; // random number between 0 and 100
  if (z>10) {
   policeCarx = policeCarx + SPEED;
   thiefx=thiefx+SPEED;} // move forward

if (13 in keyPress){  // Enter key press
  policeSee=true;}

if (policeSee == true) {
      SPEED=0; } // stop moving forward

if ((SPEED==0) && (thiefx<1000)){
  ctx.drawImage(dialogue2,torchx +25,torchy-55);//draw dialougue2
    audio3.play();//play audio
    audio5.play();} }  //end if caught

function tone(){
if (timeCount<1000) {
   audio2.play();
    audio6.play(); }
  if ((timeCount<1000) && (SPEED==0)) {
    audio6.pause();
  }}

var keyPress = {} ;   // initialize  key presses
 addEventListener("keydown",
 function (e)   {
 keyPress[e.keyCode] = true;    }   , false);
 addEventListener("keyup",
 function (e)    {
   delete keyPress[e.keyCode];
  }  , false);


function policecar () {
ctx.drawImage (carImg, policeCarx-150, poiceCary) ; } //drawing police car


function nextWindow(){
                        if  ((thiefx>1000) && (policeSee==false)) // end of part2
                        window.open("set3.html", "_self"); }


function Loop()
                        {
```

```
                        console.log("Hello2");
                        thief();
  torch();
  check();
  draw();
  thinking();
  circleTime();
  nextWindow();
  tone()
    timeCount=timeCount+1;
  policecar();
                         setTimeout(Loop, 20);
                        }
                        Loop()

  }
```

05. Third HTML file

```
html>
<body>
   <style>
      body { background-image: url('background3.jpg');
      background-repeat: no-repeat;
      background-attachment: fixed;
      background-size: cover;}
    </style>

<canvas id="canvas101" width = "1000"  height = "800"> </canvas>
<script src = "set3.js"></script>
</body>
</html>
```

06. Third JS file

```
window.onload = init();
function init() {

c=document.getElementById("canvas10")
ctx=c.getContext("2d");

//audio clips
var audio5 = new Audio('busted.mp3');
audio5.volume = 0.8;

var audio2=new Audio('police.mp3');
```

```
audio2.volume = 0.01;

var audio3=new Audio('freeze.mp3');
audio3.volume=0.10;

var audio6 = new Audio('breath.mp3');
audio6.volume=0.5;


//initiating Thinking Bubble
var dialogue1=new Image();
dialogue1.src="thiefmove.png";

//initiating dialogue 01
var dialogue2=new Image();
dialogue2.src="child1.png";

//initializing police see
policeSee=false;

//thief position
var thiefx=202;
var thiefy=370;


//torch man position
var torchx=360;
var torchy=230;


//circle start
var  x1 = 900 ;
var  y1 = 310;
var SPEED = 1;


//police position
var policeCarx=20;
var poiceCary=200;
var SPEED = 1;
var carImg= new Image();
carImg.src="policecar.png" ;

//initializing time count
timeCount=0;

function thief () {
ctx.canvas.width  = window.innerWidth;
```

```
ctx.canvas.height = window.innerHeight;
var thiefImg= new Image();
if ((policeSee==true) &&  (thiefx<1000)){
thiefImg.src="thief.png" ;
}else{
   thiefImg.src="thiefC.png"}
ctx.drawImage (thiefImg, thiefx, thiefy) ; } //draw thief


function thinking (){
                        if (thiefx<350){
                        ctx.drawImage(dialogue1,thiefx+25,thiefy-55);}//draw dialougue
  }

function torch () {
var torchImg= new Image();
torchImg.src="torch.png" ;
ctx.drawImage (torchImg, torchx, torchy); }


function draw()  {
ctx.beginPath();
if (policeSee==false) {
ctx.arc (x1, y1, 100 , 0 , 6 , false);
}else {
  ctx.arc (thiefx+100, thiefy+90, 100 , 0 , 6 , false)}

ctx.fillStyle ='rgba(255, 255, 0, 0.5)';
ctx.fill(); }

function circleTime () {     //move circle
   x1 = x1 + 1+ SPEED;
   y1=y1+SPEED; }



function check() {
  var   z = Math.random() * 50; // random number between 0 and 100
  if (z>10) {
   policeCarx = policeCarx + SPEED;
   thiefx=thiefx+SPEED;} // move forward

if (13 in keyPress){  // Enter key press
  policeSee=true;}

if (policeSee == true) {
      SPEED=0; } // stop moving forward
```

```
if ((SPEED==0) && (thiefx<1000)){
  ctx.drawImage(dialogue2,torchx +25,torchy-55);//draw dialougue2
    audio3.play();//play audio
    audio5.play();} }  //end if caught

function tone(){
if (timeCount<1000) {
   audio2.play();
    audio6.play(); }
  if ((timeCount<1000) && (SPEED==0)) {
    audio6.pause();
  }}

var keyPress = {} ;   // initialize  key presses
 addEventListener("keydown",
 function (e)   {
 keyPress[e.keyCode] = true;    }   , false);
 addEventListener("keyup",
 function (e)    {
   delete keyPress[e.keyCode];
  }  , false);


function policecar () {
ctx.drawImage (carImg, policeCarx-150, poiceCary) ; } //drawing police car

function nextWindow(){
                        if  ((thiefx>1000) && (policeSee==false)) // end of part2
                        window.open("set3.html", "_self"); }

function Loop()
                        {
                         console.log("Hello2");
                         thief();
   torch();
   check();
   draw();
   thinking();
   circleTime();
   nextWindow();
   tone()
     timeCount=timeCount+1;
   policecar();
                         setTimeout(Loop, 20);
                        }
                        Loop()

    }
```