Lab 7

void draw\_1\_side(){

turn\_right\_by\_degrees(360/50.0);

draw\_distance(5);

}

void draw\_circle(int n){

if (n>0){

draw\_1\_side();

note\_position();

draw\_circle(n-1);

}

}

void background(){

cout<< "Enter the time of day: 0-23? ";

const int t = read\_int();

make\_window(800,500);

if(t <= 4 && t >= 0){

fill\_rectangle(0,0,800,500,color::black);

set\_pen\_color(color::grey);

move\_to(600,100);

}

if (t <= 8 && t >= 5){

fill\_rectangle(0,0,800,500,color::orange);

set\_pen\_color(color::yellow);

move\_to(600,200);

}

if (t <= 14 && t >= 9){

fill\_rectangle(0,0,800,500,color::light\_blue);

set\_pen\_color(color::yellow);

move\_to(650,100);

}

if (t <= 19 && t >= 15){

fill\_rectangle(0,0,800,500,color::dark\_blue);

set\_pen\_color(color::orange);

move\_to(700,100);

}

if (t <= 23 && t >= 20){

fill\_rectangle(0,0,800,500,color::black);

set\_pen\_color(color::grey);

move\_to(600,100);

}

start\_shape();

draw\_circle(360);

fill\_shape();

}

void grey\_mountains(double N){

if (N > 0){

set\_heading\_degrees(random\_in\_range(45,60));

draw\_distance(random\_in\_range(100,150));

note\_position();

set\_heading\_degrees(random\_in\_range(120,135));

draw\_distance(random\_in\_range(100,150));

note\_position();

grey\_mountains(N-1);

}

}

void red\_mountains(int P){

if (P > 0){

set\_heading\_degrees(random\_in\_range(110,120));

draw\_distance(random\_in\_range(100,150));

note\_position();

set\_heading\_degrees(random\_in\_range(50,70));

draw\_distance(random\_in\_range(100,150));

note\_position();

red\_mountains(P-1);

}

}

void green\_mountains(int G){

if (G > 0){

set\_heading\_degrees(random\_in\_range(110,120));

draw\_distance(random\_in\_range(25,75));

note\_position();

set\_heading\_degrees(random\_in\_range(55,75));

draw\_distance(random\_in\_range(25,75));

note\_position();

green\_mountains(G-1);

}

}

void mountains(int N, int P, int G){

move\_to(0,250); // grey

set\_pen\_color(color::grey);

start\_shape();

grey\_mountains(N);

move\_to(800,500);

note\_position();

move\_to(0,500);

note\_position();

move\_to(0,250); //

note\_position();

fill\_shape();

move\_to(0,275); // red

set\_pen\_color(color::red);

start\_shape();

red\_mountains(P);

move\_to(800,500);

note\_position();

move\_to(0,500);

note\_position();

move\_to(0,275); //

note\_position();

fill\_shape();

move\_to(0,320); // green

set\_pen\_color(color::dark\_green);

start\_shape();

green\_mountains(G);

move\_to(800,500);

note\_position();

move\_to(0,500);

note\_position();

move\_to(0,320); //

note\_position();

fill\_shape();

}

// single window

void single\_window(int h, int w, int x, int y){

fill\_rectangle(x, y, w, h, color::black);

}

// row of windows

void row\_of\_windows(int h, int w, int x, int y, int N){

if (N > 0){

single\_window(h,w,x,y);

move\_to(x,y);

row\_of\_windows(h, w, x + (w + 10) ,y , N - 1);

}

}

// block of windows

void block\_of\_windows(int h, int w, int x, int y, int N, int C){

if (C > 0){

row\_of\_windows(h,w,x,y,N);

move\_to(x,y);

block\_of\_windows(h,w,x, y + (h + 10), N, C - 1);

}

}

// office building

void draw\_building(int x, int y){

start\_shape();

move\_to(x,y);

note\_position();

double r = random\_in\_range(0,100) \* 0.01;

double g = random\_in\_range(0,100) \* 0.01;

double b = random\_in\_range(0,100) \* 0.01;

set\_pen\_color(r, g, b);

set\_heading\_degrees(0);

const int h = random\_in\_range(150,400);

const int w = random\_in\_range(100,200);

draw\_distance(h);

note\_position();

turn\_right\_by\_degrees(90);

draw\_distance(w);

note\_position();

turn\_right\_by\_degrees(90);

draw\_distance(h);

note\_position();

turn\_right\_by\_degrees(90);

draw\_distance(w);

note\_position();

fill\_shape();

int N = random\_in\_range(4,7);

int C = random\_in\_range(5,9);

int w\_window = (w/N) - 10;

int h\_window = (h/C) - 15;

int x\_window = x + 10;

int y\_window = (y - h) + 10;

block\_of\_windows(h\_window, w\_window, x\_window, y\_window, N, C);

}

// draw city

void draw\_city(int x, int y){

int width\_left = 800 - x;

int width\_between\_buildings = random\_in\_range(180,250);

if (width\_left > width\_between\_buildings){

draw\_building(x, y);

draw\_city(x + width\_between\_buildings, y);

}

}

// houses

const double pi = acos(-1.0);

const double deg2rad = pi/180.0;

void single\_house\_window(int h, int w, int x, int y){

fill\_rectangle(x, y, w, h, color::light\_blue);

}

void row\_house\_windows(int h, int w, int x, int y, int N){

if (N > 0){

single\_house\_window(h,w,x,y);

move\_to(x,y);

row\_house\_windows(h, w, x + (w + 10) ,y , N - 1);

}

}

void block\_house\_windows(int h, int w, int x, int y, int N, int C){

if (C > 0){

row\_house\_windows(h,w,x,y,N);

move\_to(x,y);

block\_house\_windows(h,w,x, y + (h + 10), N, C - 1);

}

}

void draw\_house(int x, int y){

int w = random\_in\_range(75,150);

int h = random\_in\_range(75,150);

fill\_rectangle(x, y - h, w, h, color::yellow);

start\_shape();

set\_pen\_color(color::brown);

int x2 = x - 5;

int y2 = y - h;

move\_to(x2, y2);

note\_position();

set\_heading\_degrees(90);

draw\_distance(w + 10);

note\_position();

double theta = random\_in\_range(45,60);

set\_heading\_degrees(270 + theta);

const int side\_length = (w/2 + 5)/cos(theta \* deg2rad);

draw\_distance(side\_length);

note\_position();

set\_heading\_degrees(270 - theta);

draw\_distance(side\_length);

note\_position();

fill\_shape();

int N = random\_in\_range(2,4);

int C = random\_in\_range(2,3);

int w\_window = (w/N) - 15;

int h\_window = (h/C) - 15;

int x\_window = x + 10;

int y\_window = (y - h) + 10;

block\_house\_windows(h\_window, w\_window, x\_window, y\_window, N, C);

}

void draw\_suburbs(int x, int y){

int width\_left = 800 - x;

int width\_between\_buildings = random\_in\_range(150,200);

if (width\_left > width\_between\_buildings){

draw\_house(x, y);

draw\_suburbs(x + width\_between\_buildings, y);

}

}

// trees

void draw\_leaves(int x, int y, int count){

if (count > 0){

set\_pen\_color(color::green);

set\_pen\_width(random\_in\_range(1,5));

move\_to(x + random\_in\_range(-15,15), y + random\_in\_range(-15,15));

draw\_point();

draw\_leaves(x, y, count - 1);

}

}

void draw\_tree(int x, int y){

move\_to(x,y);

set\_pen\_color(color::brown);

set\_pen\_width(5);

set\_heading\_degrees(0);

int h = random\_in\_range(45,60);

draw\_distance(h);

draw\_leaves(x, y - h, 150);

}

void draw\_multiple\_trees(int x, int y){

int width\_left = 800 - x;

int width\_between\_trees = random\_in\_range(25,200);

if (width\_left > width\_between\_trees){

draw\_tree(x, y);

draw\_multiple\_trees(x + width\_between\_trees, y);

}

}

void main(){

background();

mountains(8, 10, 20);

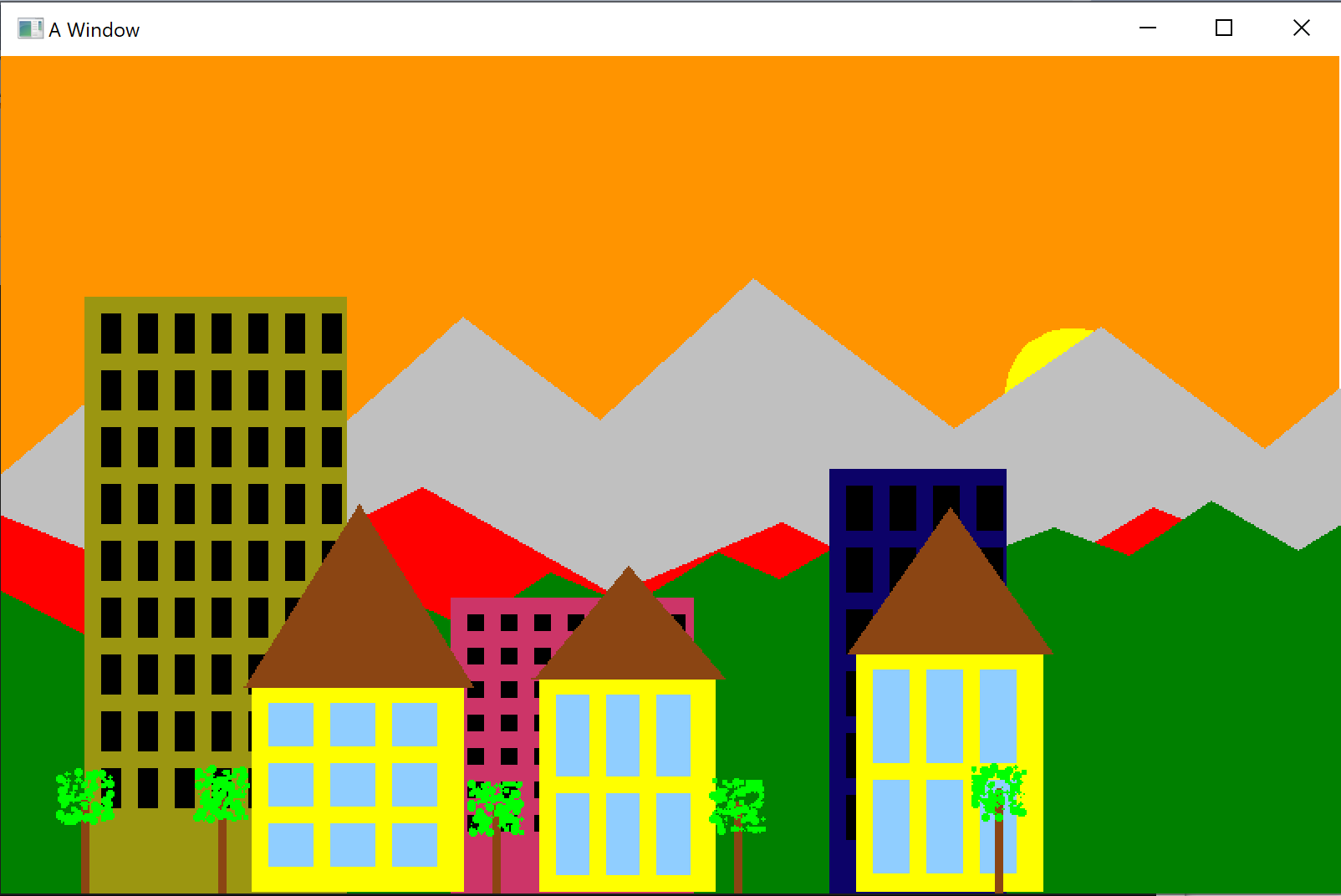
draw\_city(50, 500);

draw\_suburbs(150,500);

draw\_multiple\_trees(50,500);

}

7 o’clock



22 o’clock

