

CSIS0230A Principle of Operating Systems (Class A)

Tutorial 1

C++ to C translation

In this workshop, you are going to translate a C++ program to C.

The program does a very simple thing: to ask for the description of some circles, and then display ASCII drawing of all of them.

Here is the source code of the C++ program.

Be reminded that it might not be possible to complete the translation during the tutorial hour. In working, first design the data types required, next the prototypes of all the needed functions, and finally the function bodies. Good luck.

```
#include <iostream>
#include <string>
#include <vector>
#include <map>
using namespace std;

// Represent a circle, the only currently supported concrete type
class Circle {
public:
    Circle(int yy, int xx, int rr): y(yy), x(xx), r(rr) {}
    bool in_figure(int y, int x) {
        int ydiff = y - this->y, xdiff = x - this->x;
        return ydiff * ydiff + xdiff * xdiff <= r * r;
    }
    static Circle* read() {
        int y, x, r;
        cout << "y? "; cin >> y;
        cout << "x? "; cin >> x;
        cout << "r? "; cin >> r;
        return new Circle(y, x, r);
    }
private:
    int y, x, r;
};

vector<Circle *> figures;

// Ask for a full list of figures
void ask_for_figures() {
    for (;;) {
        char done;
        cout << "Done? (y/n) "; cin >> done;
        if (done=='y')
            break;
        else
            figures.push_back(Circle::read());
    }
}

// Draw the figures to the screen
void draw_figures() {
    for (int y = 0; y < 24; ++y) {
        for (int x = 0; x < 79; ++x) {
            char c = '.';
            for (vector<Circle *>::iterator i = figures.begin(); i != figures.end(); ++i)
                if ((*i)->in_figure(y, x))
                    c = 'O';
        }
    }
}
```

```
                                }
                                cout << c;
                            }
                            cout << endl;
                        }
                    }

int main() {
    ask_for_figures();
    draw_figures();
}
```