Decision Structures

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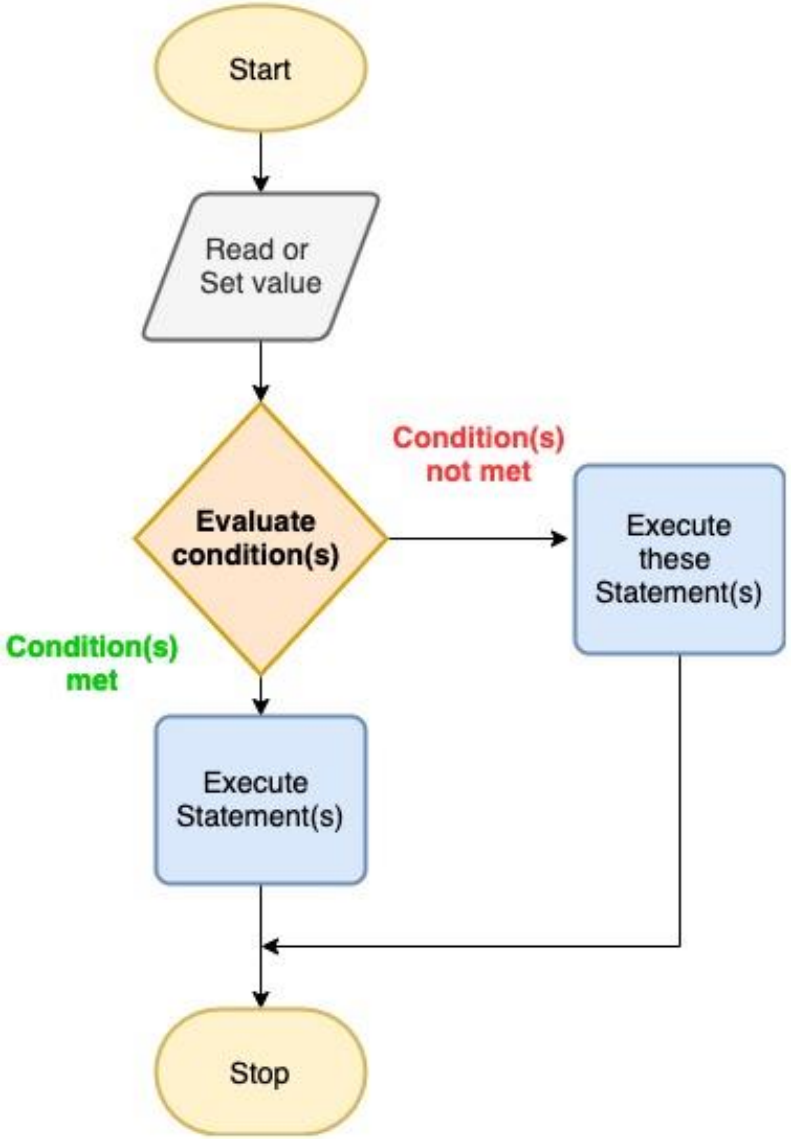
Decision Structures

Allows us to make more complex programs; programs with *multiple paths of execution*



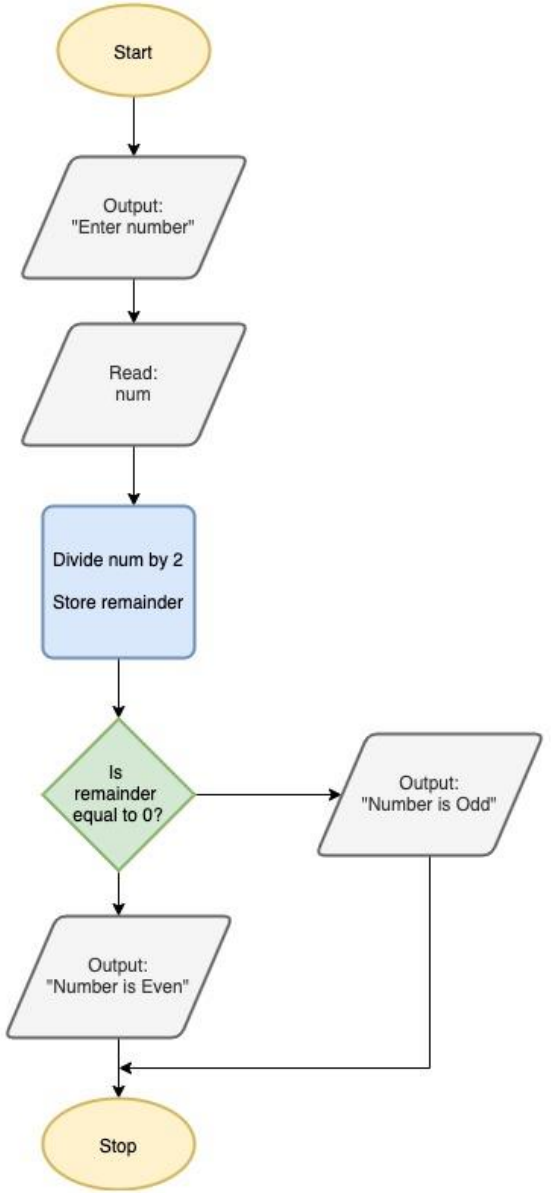
Cases

1. Odd or Even Number program
2. Amusement Park Ticketing program
3. GPA Calculator program

Case 1

Odd or Even Number program

Case 1 – Odd or Even Numbers



If statements

if (*condition met*) {

statement;

}**else**{

next_statement;

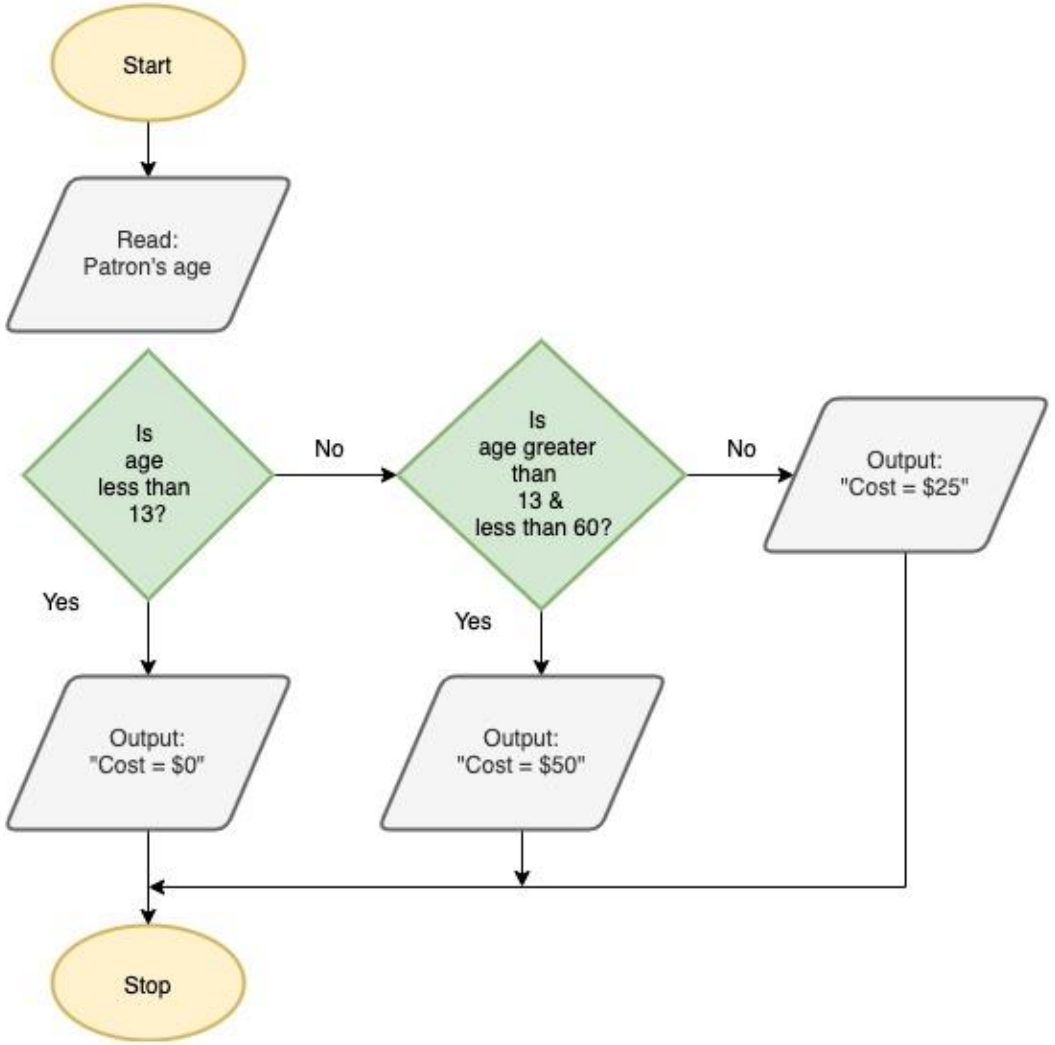
}

```
// Odd or Even Number program
#include <iostream>

using std::cin;
using std::cout;
using std::endl;

int main()
{
    int num = 0;
    cout << "Enter a number between 0 & 1000: ";
    cin >> num;

    if(num%2 == 0){
        cout << "\n Number is even";
    }else{
        cout << "\n Number is odd";
    }

    return 0;
}
```

Case 2

Amusement Park Ticketing program

Case 2 – Determining Price of Ticket



If statements Cont'd

if (*condition*){

statement;

}**else if** (*condition*){

next_statement;

}**else**{

another_statement;

}

```
// Amuzement Park Ticket program
#include <iostream>

using std::cin;
using std::cout;
using std::endl;

int main()
{
    short int age = 0;
    cout << "Enter you age: ";
    cin >> age;

    if(age < 13){
        cout << "\n Ticket price is $0";
    }else if(age>=13 && age <60){
    cout << "\n Ticket price is $50";
    }else{
        cout << "\n Ticket price is $25";
    }

    return 0;
}
```

If statements Cont'd

if (*condition*) {
    statement;
}**else** (*condition*) {
    next_statement;
}

vs

if (*condition*) {
    statement;
}**if** (*condition*) {
    next_statement;
}

```
#include<iostream>
int main() {
 int large = 2,larger = 4;
 if (large < larger) {
  std::cout<<large<<"is less than"<<larger<<std::endl;
  large = 10; //note the change in variable value
 }
 else if (large > larger) {
  std::cout<<large<<"is greater than"<<larger<<std::endl;
 }
 return 0;
}
```

If statements Cont'd

if (*condition*) {
    statement;
}**else** (*condition*) {
    next_statement;
}

vs

if (*condition*) {
    statement;
}**if** (*condition*) {
    next_statement;
}

```
#include<iostream>
int main() {
 int large = 2,larger = 4;
 if (large < larger) {
  std::cout<<large<<"is less than"<<larger<<std::endl;
  large = 10; //note the change in variable value
 }
 if (large > larger) {//if instead of if else
  std::cout<<large<<"is greater than"<<larger<<std::endl;
 }
 return 0;
}
```

If statements Cont'd

if (*condition*) {
    statement;
}**else** (*condition*) {
    next_statement;
}

vs

if (*condition*) {
    statement;
}**if** (*condition*) {
    next_statement;
}

- Using if-else

```
2 is less than 4
```

- Using if only

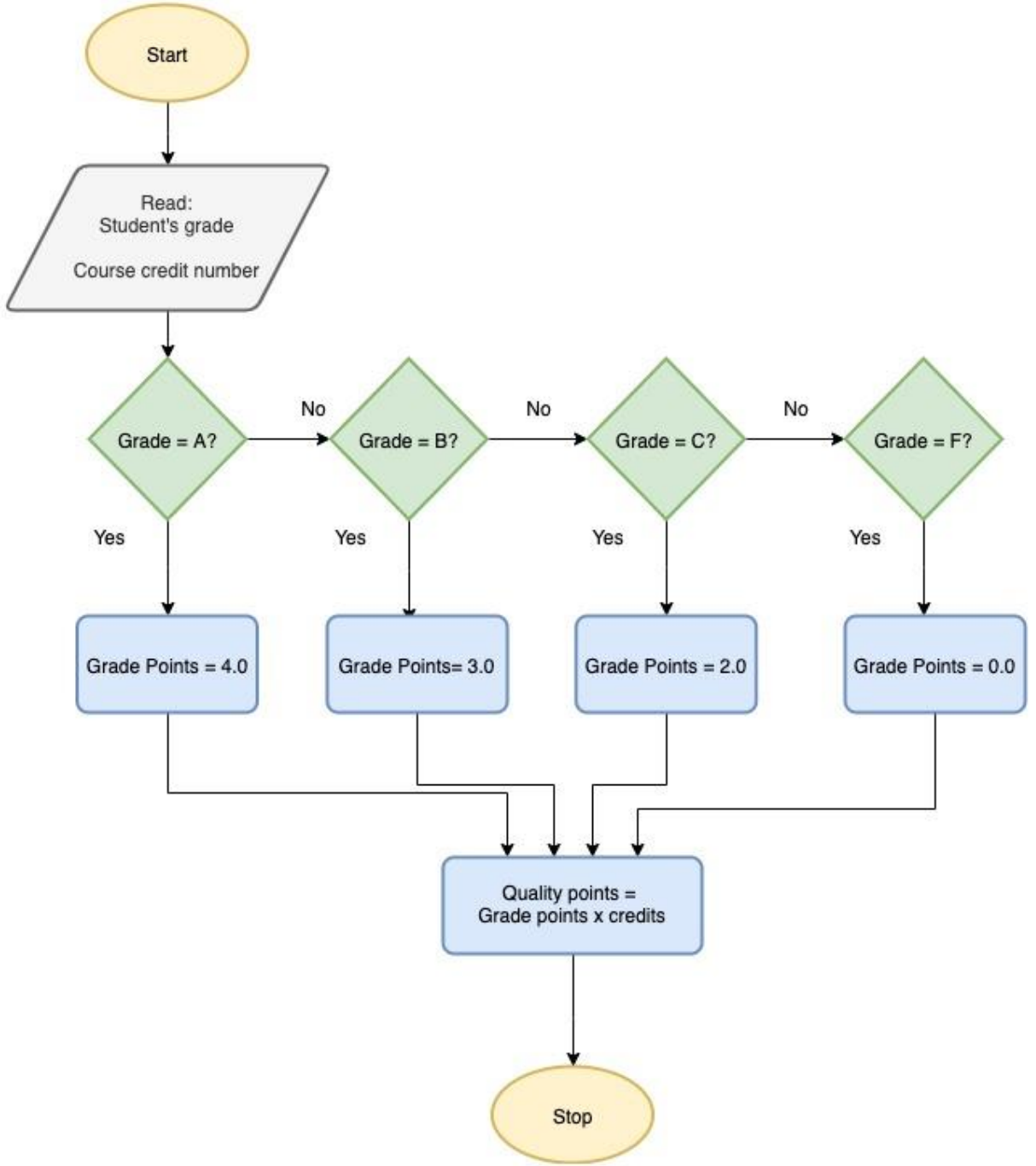
```
2 is less than 4
10 is greater than 4
```

- If-else exits the entire if block as soon as one condition evaluates to true
- Using ifs only is effectively a new, separate control flow and not part of the previous if statement (unless if is nested)

Case 3

GPA Calculator Program

Case 3 – Calculating Quality Points



Switch Case Statement

switch (variable){

case 'first_value':

statement;

break;

case 'second_value':

statement;

break;

default:

statement[

}

```
//Assuming all header files and using std::cout declared etc
int main(){
    char grade = ' ';
    int credits = 0;
    float points = 0.0;
    float qualityPts = 0.0;

    cout << "Enter student's grade(A, B, C, or F): ";
    cin >> grade;
    cout << "\nEnter course credits: ";
    cin >> credits;

    switch (grade){
        case 'A':
            points = 4.0;
            break;
        case 'B':
            points = 3.0;
            break;
        case 'C':
            points = 2.0;
            break;
        case 'F':
            points = 0.0;
            break;
        default:
            cout << "\nInvalid value entered" << endl;
    }

    qualityPts = credits * points;
    cout << "\nQuality Points for course = " << qualityPts << endl;

    return 0;
}
```

That’s All