C++ Programming

11th Study: Object-Oriented Programming (7/8)

- Operator overloading

C++ Korea 옥찬호 (utilForever@gmail.com)

Operator overloading

A specific case of polymorphism, where different operators have different implementations depending on their arguments

Operator overloading

- 연산자 오버로딩(Operator overloading)?
  - C나 C++에서 기본으로 제공하는 연산자를 함수 처럼 매개변수의 개수나 자료 형에 따라 오버로딩 하여 사용할 수 있도록 하는 것.
  - +, -, *, / 등의 기본 이항 연산자부터 =, ->,* 등의 연산자 까지 대부분의 연산자에 대해 오버로딩이 가능하다.
  - 단, operator.(멤버 참조 연산자), operator?: (조건 연산자), operator:: (범위 결정 연산자), operator.* (멤버 포인트 연산자)는 오버로딩이 불가능하다.

Operator overloading

- 연산자 오버로딩의 문법적 표현
  - Return_type operator+(parameter);

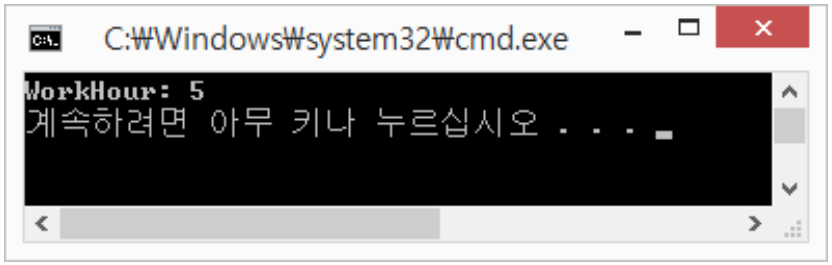
  - 예
    - WorkHour operator+ (const WorkHour& workobj);
    - Const ,&로 파라미터를 넘기는 이유는 복사에 의한 오버헤드를 줄이고, workobj의 안정성을 유지하기 위해

Operator overloading: Example

```
class WorkHour {
private:
    int workHour;
public:
    WorkHour(int w) : workHour(w)
    {}

    void  printWorkHour()
    {
          cout << “WorkHour: ” << workHour << endl;
    }

    WorkHour add(const WorkHour& work) {
          WorkHour wh(this->workHour + work.workHour);
          return wh;
    }
};
```

```
int main() {
    WorkHour Aworker(2);
    WorkHour Bworker(3);
    WorkHour total = Aworker.add(Bworker);
    total.printWorkhour();
}
```

Operator overloading: Example

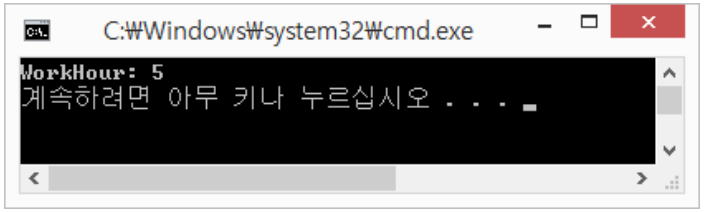


Operator overloading: Example

```
class WorkHour {
private:
    int workHour;
public:
    WorkHour(int w) : workHour(w)
    {}

    void  printWorkHour()
    {
          cout << “WorkHour: ” << workHour << endl;
    }

    WorkHour add(const WorkHour& work) {
          WorkHour wh(this->workHour + work.workHour);
          return wh;
    }

    WorkHour operator+(const WorkHour& work) {
          WorkHour wh(this->workHour + work.workHour);
          return wh;
    }

};
```

```
int main() {
    WorkHour Aworker(2);
    WorkHour Bworker(3);
    WorkHour total = Aworker + Bworker;
    total.printWorkhour();
}
```

Operator overloading: Example

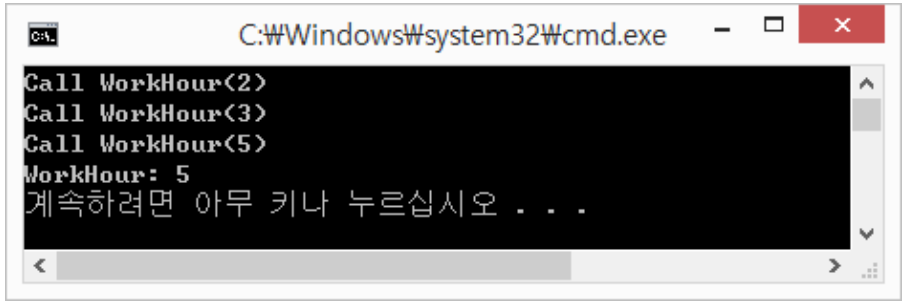


Operator overloading: Example

```
class WorkHour {
private:
    int workHour;
public:
    WorkHour(int w) : workHour(w)
    {
           cout << “Call WorkHour(” << w<< “)” endl;
    }

    void  printWorkHour()
    {
          cout << “WorkHour: ” << workHour << endl;
    }

    WorkHour add(const WorkHour& work) {
          WorkHour wh(this->workHour + work.workHour);
          return wh;
    }

    WorkHour operator+(const WorkHour& work) {
          WorkHour wh(this->workHour + work.workHour);
          return wh;
    }
};
```

```
int main() {
    WorkHour Aworker(2);
    WorkHour total = Aworker + 3;
    total.printWorkhour();
}
```

Operator overloading: Example



Operator overloading: Example

```
class WorkHour {
private:
    int workHour;
public:
    WorkHour(int w) : workHour(w)
    {
           cout << “Call WorkHour(” << w<< “)” endl;
    }

    void  printWorkHour()
    {
          cout << “WorkHour: ” << workHour << endl;
    }

    WorkHour operator+(const WorkHour& work) {
          WorkHour wh(this->workHour + work.workHour);
          return wh;
    }
};
```

```
int main() {
    WorkHour Aworker(2);
    WorkHour total = 3 + Aworker;
    total.printWorkhour();
}
```

Operator overloading: Example

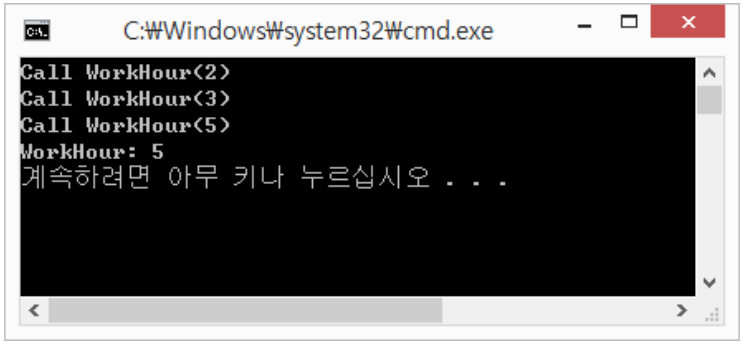
error: C2677: 이항 ‘+’ : ‘WorkHour’ 형식을 사용하는 전역 연산자가 없거나 허용되는 변환이 없습니다.

Operator overloading: Example

```
class WorkHour {
private:
    int workHour;
public:
    WorkHour(int w) : workHour(w)
    {
           cout << “Call WorkHour(” << w<< “)” endl;
    }

    void  printWorkHour()
    {
          cout << “WorkHour: ” << workHour << endl;
    }

    friend WorkHour operator+(const WorkHour& work1,
          const WorkHour& work2);
};

WorkHour operator+(const WorkHour& work1, const WorkHour&
work2) {
          WorkHour work(work1.workHour + work2.workHour);
          return work;
}
```

```
int main() {
    WorkHour Aworker(2);
    WorkHour total = 3 + Aworker;
    total.printWorkhour();
}
```

Operator overloading: Example



Operator overloading: Example

```
class WorkHour {
private:
    int workHour;
public:
    WorkHour(int w) : workHour(w)
    {

    }

    void  printWorkHour()
    {
          cout << “WorkHour: ” << workHour << endl;
    }

    WorkHour operator+(const WorkHour& work) {
          WorkHour wh(this->workHour + work.workHour);
          cout << “operator+(work)” << endl;
          return wh;
    }
    friend WorkHour operator+(const WorkHour& work1,
          const WorkHour& work2);
};
```

```
WorkHour operator+(const WorkHour& work1, const WorkHour&
work2)
{
     WorkHour work(work1.workHour + work2.workHour);
     cout << “operator+(work1, work2);” << endl;
     return work;
}

int main() {
    WorkHour Aworker(2);
    WorkHour Bworker(3)
    WorkHour total1 = 3 + Aworker;
    WorkHour total2 = Bworker + 3
    total1.printWorkhour();
    total2.printWorkhour();

}
```

Operator overloading: Example