PEMROGRAMAN BERBASIS OBJEK

(Tugas 7)

Disusun Oleh:

Prames Ray Lapian – 140810210059

PROGRAM STUDI S-1 TEKNIK INFORMATIKA

FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM

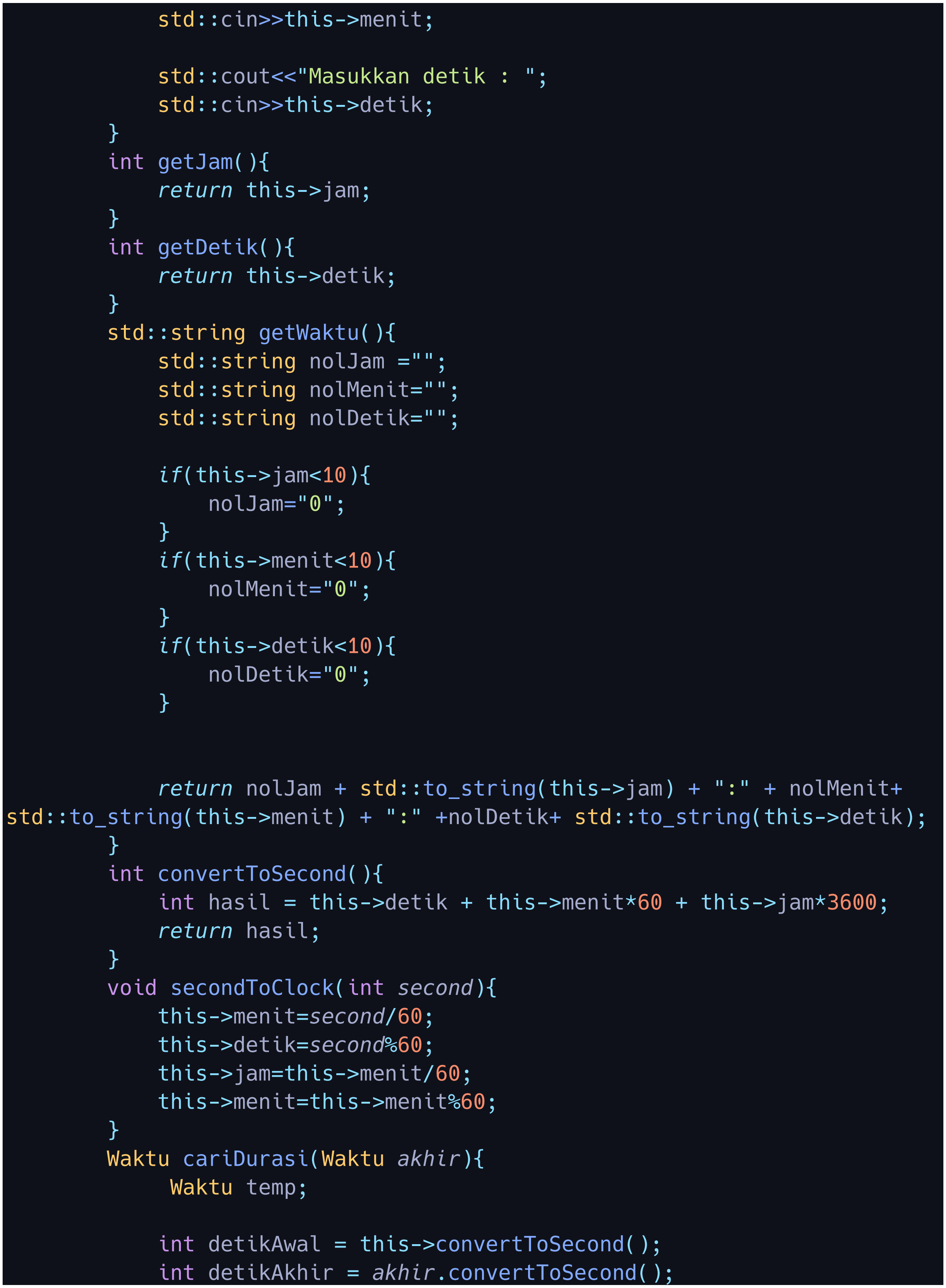
UNIVERSITAS PADJADJARAN

JATINANGOR

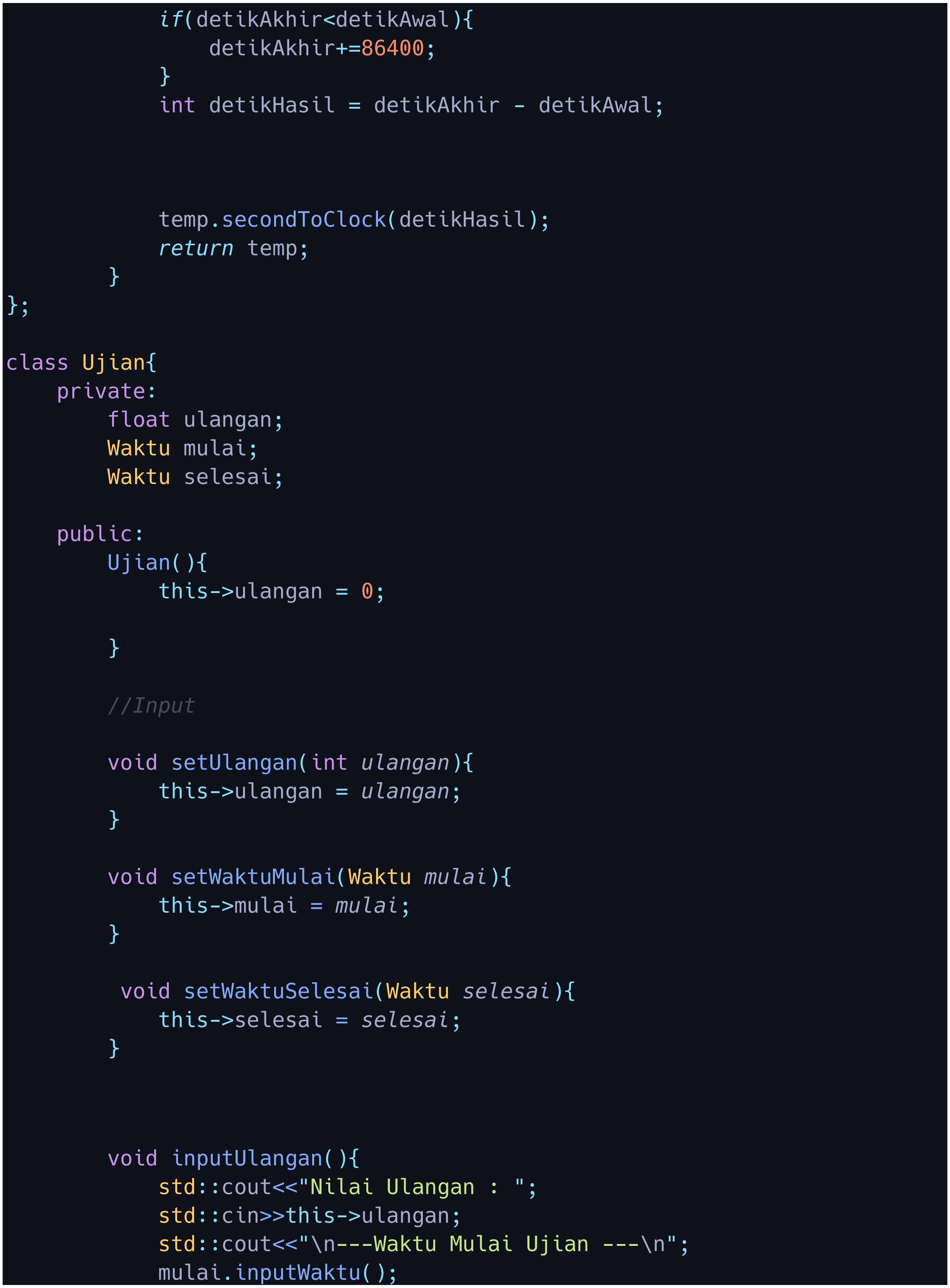
2022

1. Soal 1:
    a. Source Code:
        i. C++

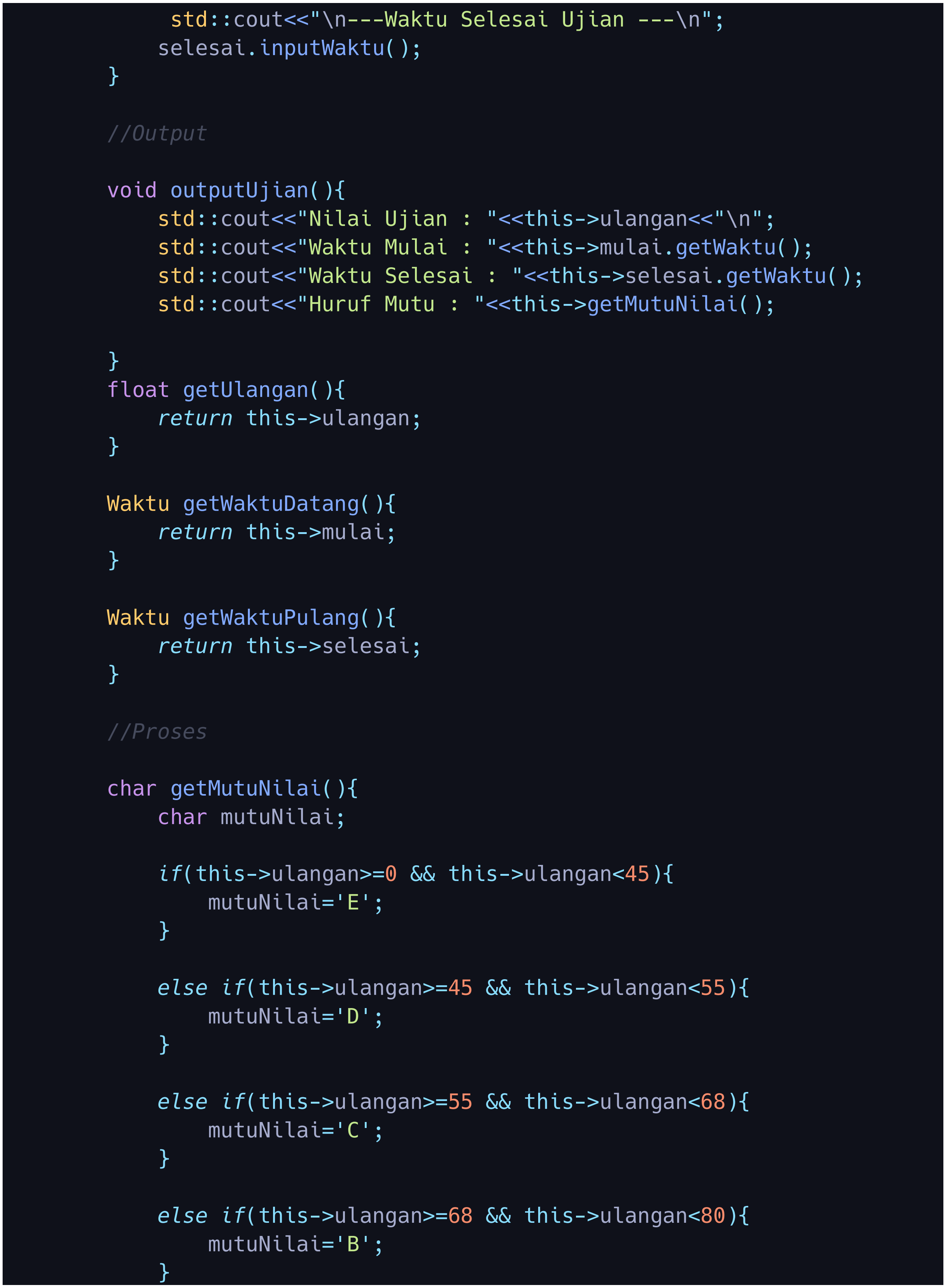
```
/*
Nama          : Amir Salim , Andre Nathaniel Adipraja , Prames Ray lapian
, Ibrahim Dafi Iskandar
NPM           : 140810210015 , 140810200042 , 140810210059 , 140810210039
Kelas         : A
Tanggal       : 19 Oktober 2022
Nama Program  : Soal1_ArrOOP.cpp
Deskripsi     : program untuk mencari nilai mahasiswa
*/

#include<iostream>

class Waktu{
    private:
        int jam,menit,detik;

    public:
        Waktu(int jam,int menit,int detik){
            this->jam = jam;
            this->menit = menit;
            this->detik = detik;
        }
        Waktu(){
            this->jam = 0;
            this->menit =0;
            this->detik=0;
        }
        void setJam(int jam){
            this->jam = jam;
        }
        void setMenit(int menit){
            this->menit = menit;
        }
        void setDetik(int detik){
            this->detik = detik;
        }
        void inputWaktu(){
            std::cout<<"Masukkan jam : ";
            std::cin>>this->jam;

            std::cout<<"Masukkan menit : ";
```



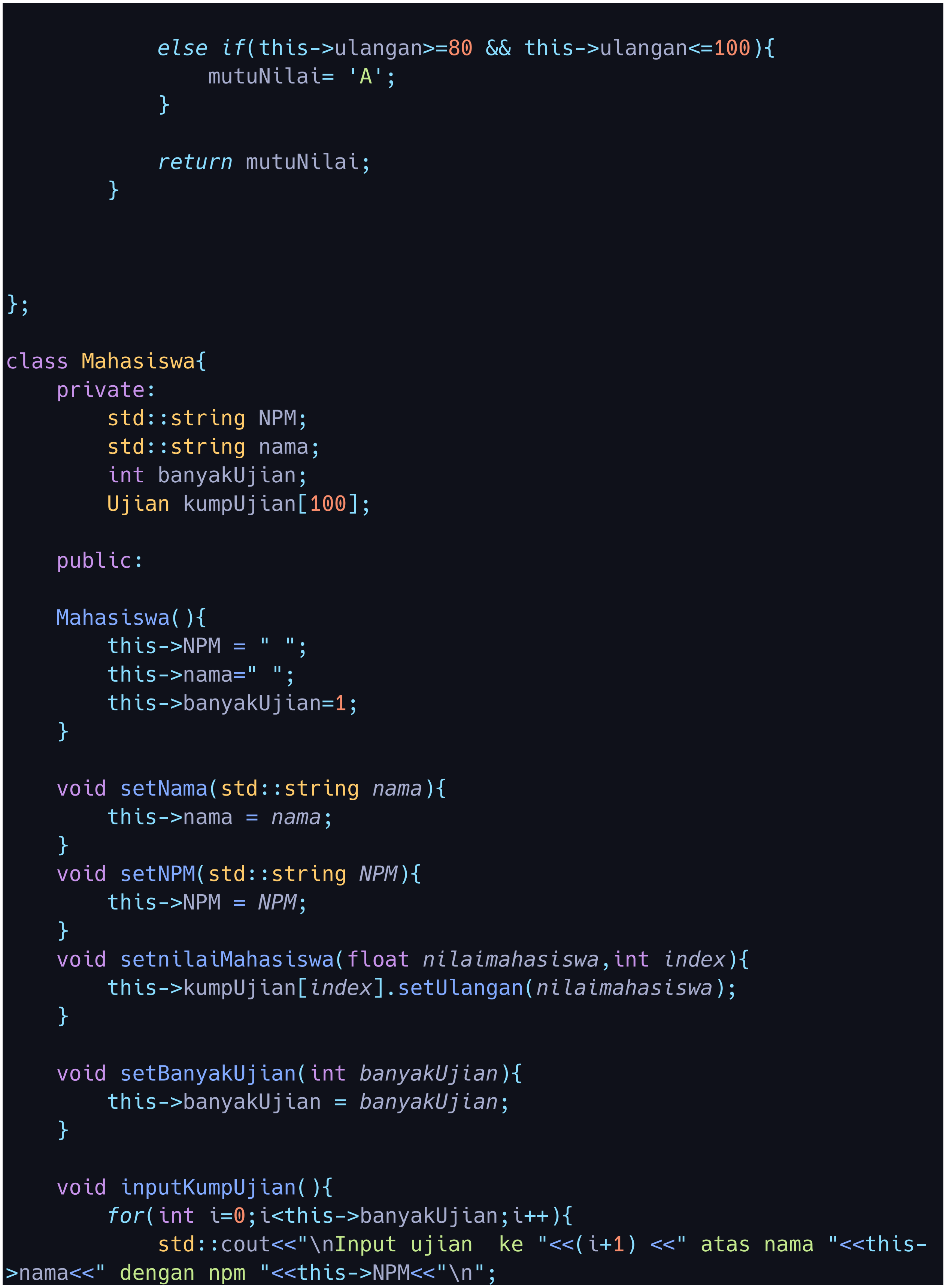
```
            std::cin>>this->menit;

            std::cout<<"Masukkan detik : ";
            std::cin>>this->detik;
        }
        int getJam(){
            return this->jam;
        }
        int getDetik(){
            return this->detik;
        }
        std::string getWaktu(){
            std::string nolJam ="";
            std::string nolMenit="";
            std::string nolDetik="";

            if(this->jam<10){
                nolJam="0";
            }
            if(this->menit<10){
                nolMenit="0";
            }
            if(this->detik<10){
                nolDetik="0";
            }


            return nolJam + std::to_string(this->jam) + ":" + nolMenit+
std::to_string(this->menit) + ":" +nolDetik+ std::to_string(this->detik);
        }
        int convertToSecond(){
            int hasil = this->detik + this->menit*60 + this->jam*3600;
            return hasil;
        }
        void secondToClock(int second){
            this->menit=second/60;
            this->detik=second%60;
            this->jam=this->menit/60;
            this->menit=this->menit%60;
        }
        Waktu cariDurasi(Waktu akhir){
             Waktu temp;

            int detikAwal = this->convertToSecond();
            int detikAkhir = akhir.convertToSecond();
```



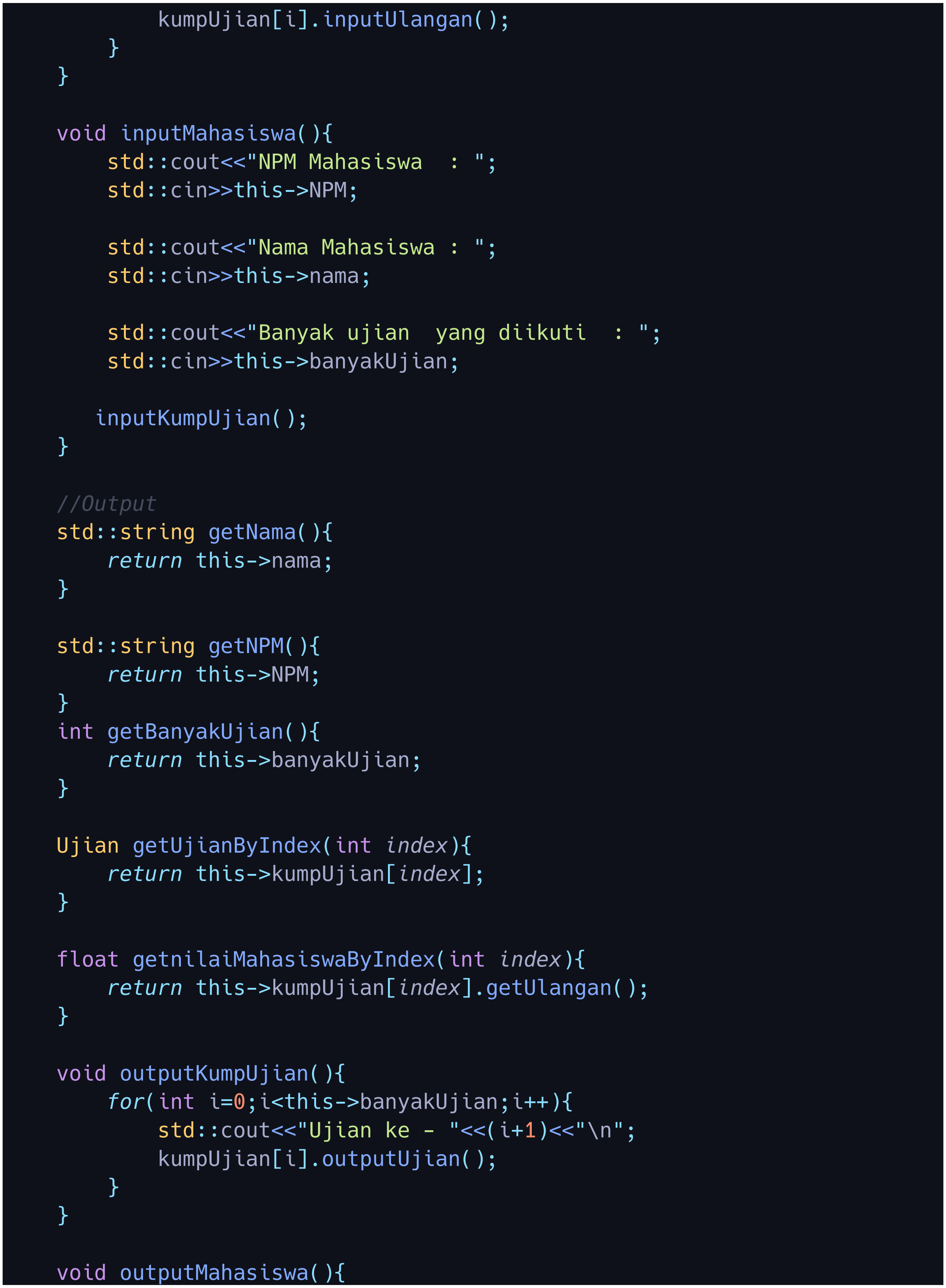
```
            if(detikAkhir<detikAwal){
                detikAkhir+=86400;
            }
            int detikHasil = detikAkhir - detikAwal;



            temp.secondToClock(detikHasil);
            return temp;
        }
};

class Ujian{
    private:
        float ulangan;
        Waktu mulai;
        Waktu selesai;

    public:
        Ujian(){
            this->ulangan = 0;

        }

        //Input

        void setUlangan(int ulangan){
            this->ulangan = ulangan;
        }

        void setWaktuMulai(Waktu mulai){
            this->mulai = mulai;
        }

         void setWaktuSelesai(Waktu selesai){
            this->selesai = selesai;
        }



        void inputUlangan(){
            std::cout<<"Nilai Ulangan : ";
            std::cin>>this->ulangan;
            std::cout<<"\n---Waktu Mulai Ujian ---\n";
            mulai.inputWaktu();
```



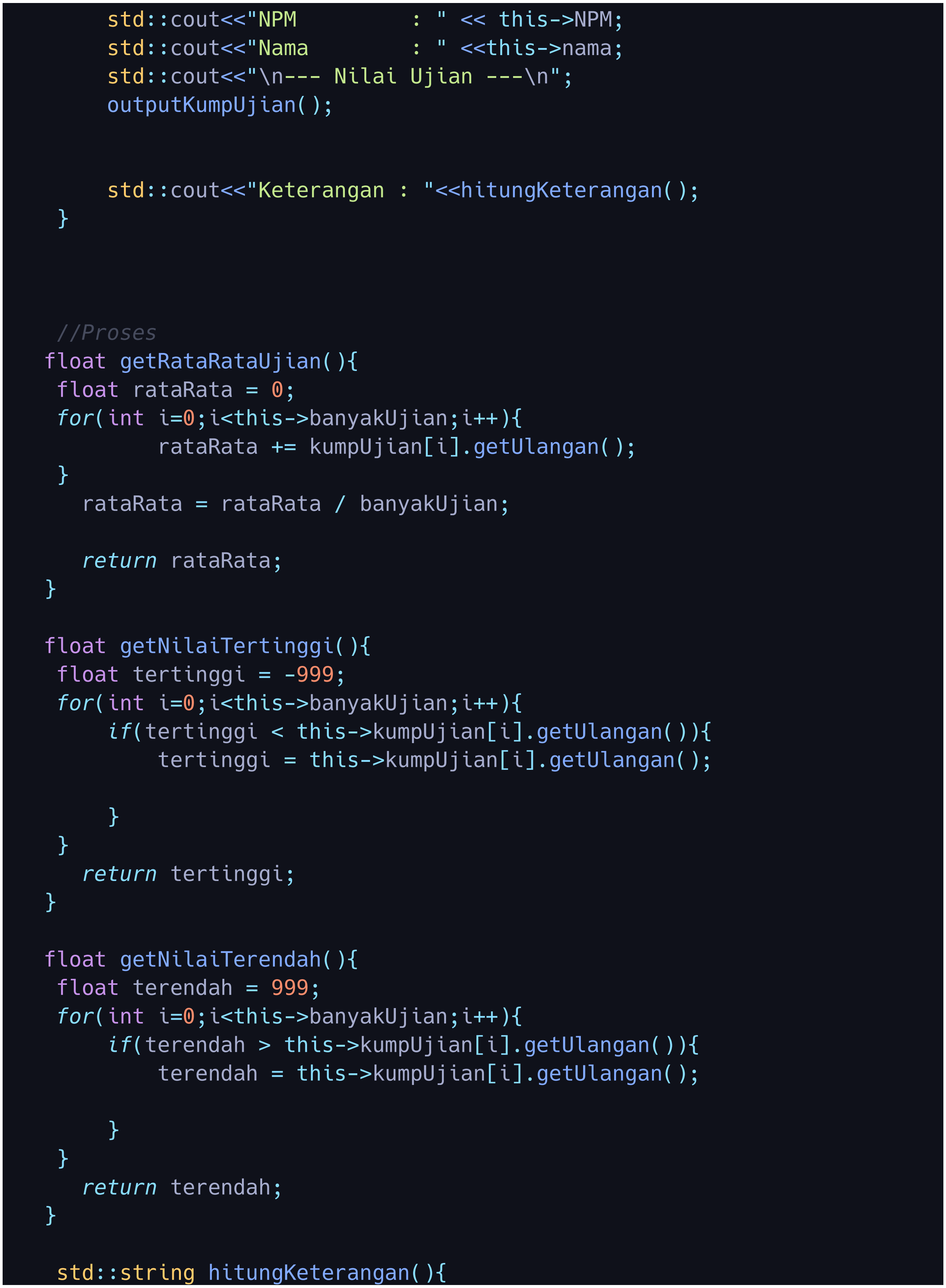
```
         std::cout<<"\n---Waktu Selesai Ujian ---\n";
        selesai.inputWaktu();
    }

    //Output

    void outputUjian(){
        std::cout<<"Nilai Ujian : "<<this->ulangan<<"\n";
        std::cout<<"Waktu Mulai : "<<this->mulai.getWaktu();
        std::cout<<"Waktu Selesai : "<<this->selesai.getWaktu();
        std::cout<<"Huruf Mutu : "<<this->getMutuNilai();

    }
    float getUlangan(){
        return this->ulangan;
    }

    Waktu getWaktuDatang(){
        return this->mulai;
    }

    Waktu getWaktuPulang(){
        return this->selesai;
    }

    //Proses

    char getMutuNilai(){
        char mutuNilai;

        if(this->ulangan>=0 && this->ulangan<45){
            mutuNilai='E';
        }

        else if(this->ulangan>=45 && this->ulangan<55){
            mutuNilai='D';
        }

        else if(this->ulangan>=55 && this->ulangan<68){
            mutuNilai='C';
        }

        else if(this->ulangan>=68 && this->ulangan<80){
            mutuNilai='B';
        }
```



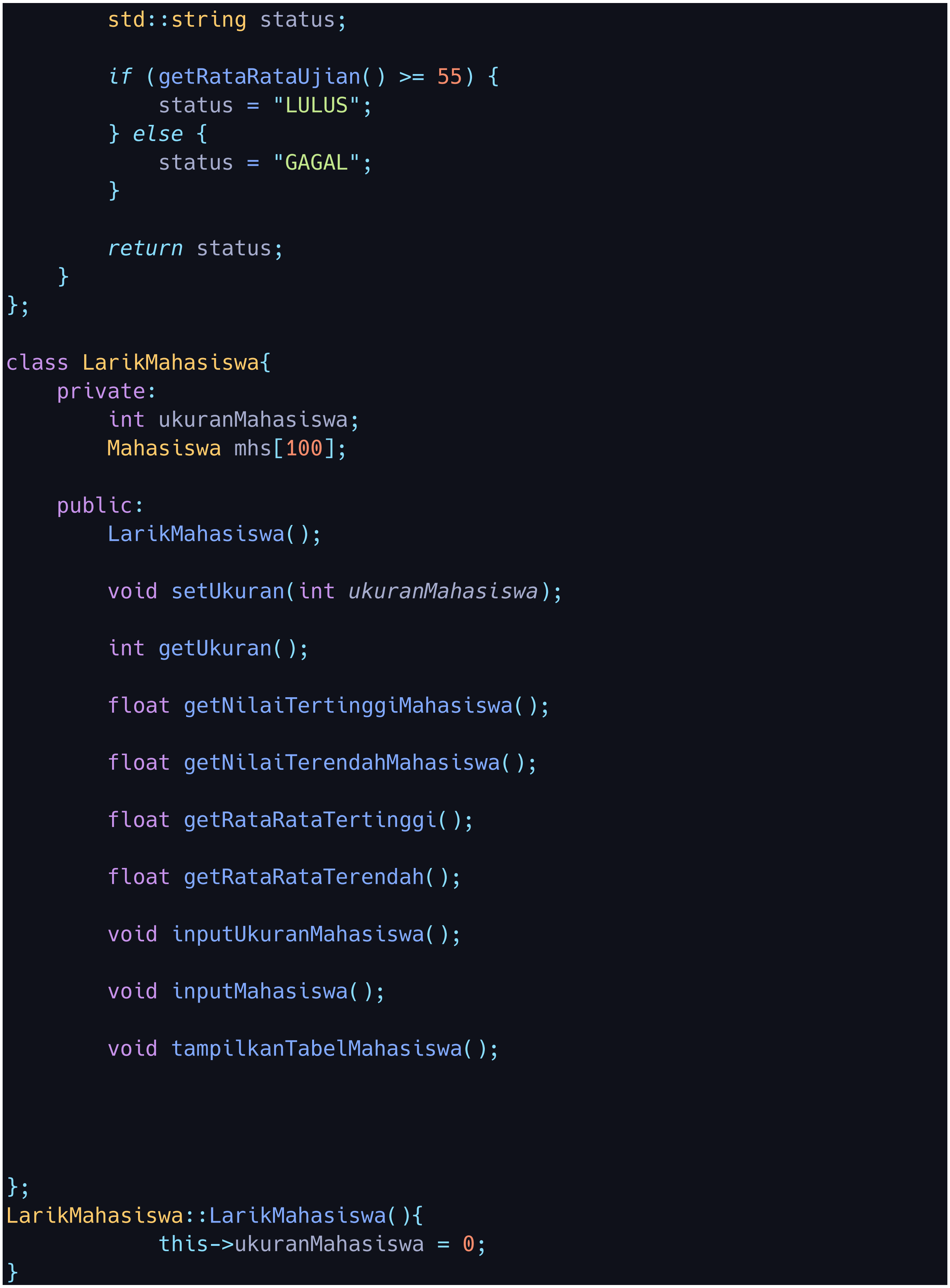
```
            else if(this->ulangan>=80 && this->ulangan<=100){
                mutuNilai= 'A';
            }

            return mutuNilai;
        }



};

class Mahasiswa{
    private:
        std::string NPM;
        std::string nama;
        int banyakUjian;
        Ujian kumpUjian[100];

    public:

    Mahasiswa(){
        this->NPM = " ";
        this->nama=" ";
        this->banyakUjian=1;
    }

    void setNama(std::string nama){
        this->nama = nama;
    }
    void setNPM(std::string NPM){
        this->NPM = NPM;
    }
    void setnilaiMahasiswa(float nilaimahasiswa,int index){
        this->kumpUjian[index].setUlangan(nilaimahasiswa);
    }

    void setBanyakUjian(int banyakUjian){
        this->banyakUjian = banyakUjian;
    }

    void inputKumpUjian(){
        for(int i=0;i<this->banyakUjian;i++){
            std::cout<<"\nInput ujian  ke "<<(i+1) <<" atas nama "<<this-
>nama<<" dengan npm "<<this->NPM<<"\n";
```



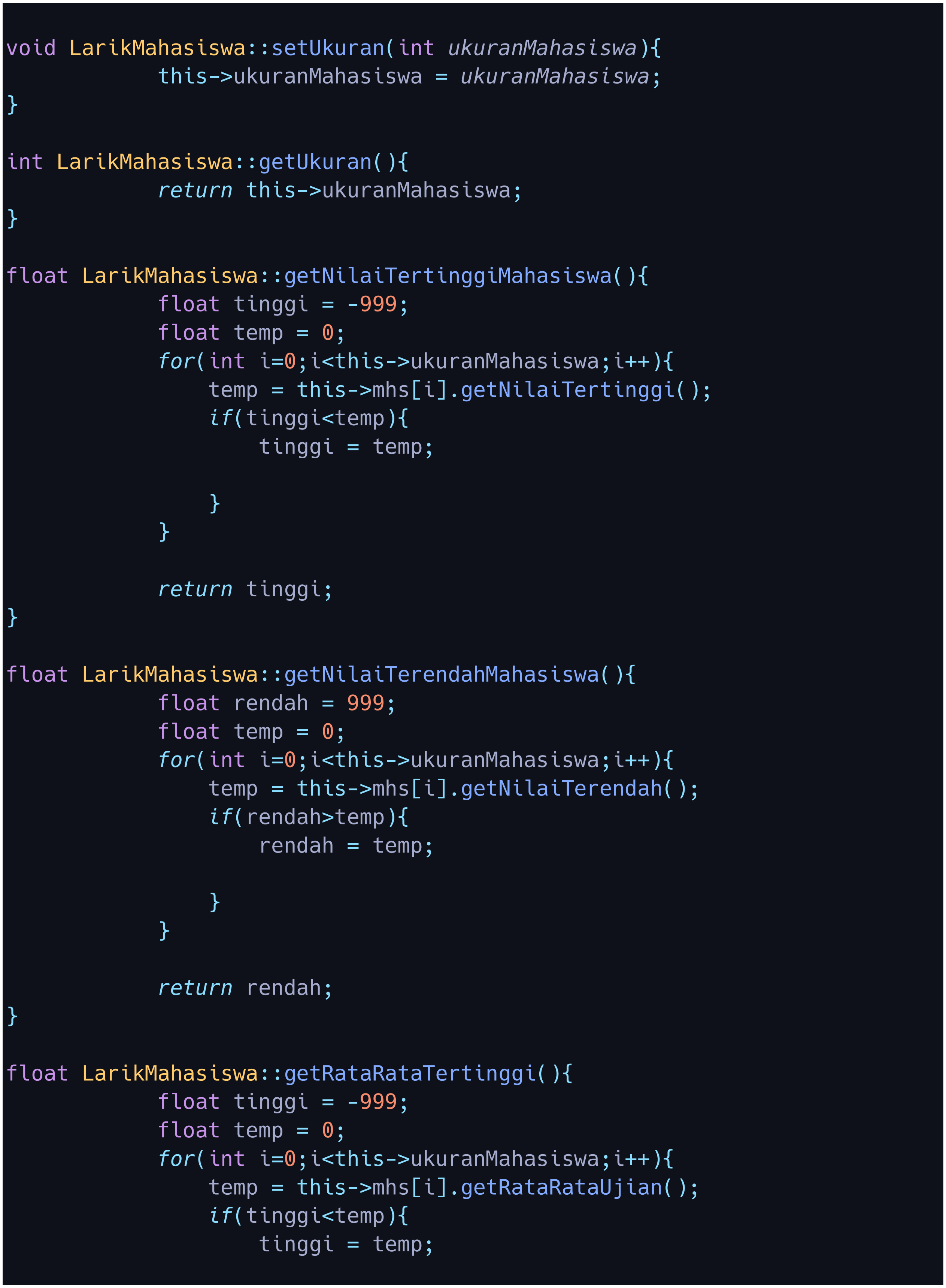
```
            kumpUjian[i].inputUlangan();
        }
    }

    void inputMahasiswa(){
        std::cout<<"NPM Mahasiswa  : ";
        std::cin>>this->NPM;

        std::cout<<"Nama Mahasiswa : ";
        std::cin>>this->nama;

        std::cout<<"Banyak ujian  yang diikuti  : ";
        std::cin>>this->banyakUjian;

       inputKumpUjian();
    }

    //Output
    std::string getNama(){
        return this->nama;
    }

    std::string getNPM(){
        return this->NPM;
    }
    int getBanyakUjian(){
        return this->banyakUjian;
    }

    Ujian getUjianByIndex(int index){
        return this->kumpUjian[index];
    }

    float getnilaiMahasiswaByIndex(int index){
        return this->kumpUjian[index].getUlangan();
    }

    void outputKumpUjian(){
        for(int i=0;i<this->banyakUjian;i++){
            std::cout<<"Ujian ke - "<<(i+1)<<"\n";
            kumpUjian[i].outputUjian();
        }
    }

    void outputMahasiswa(){
```



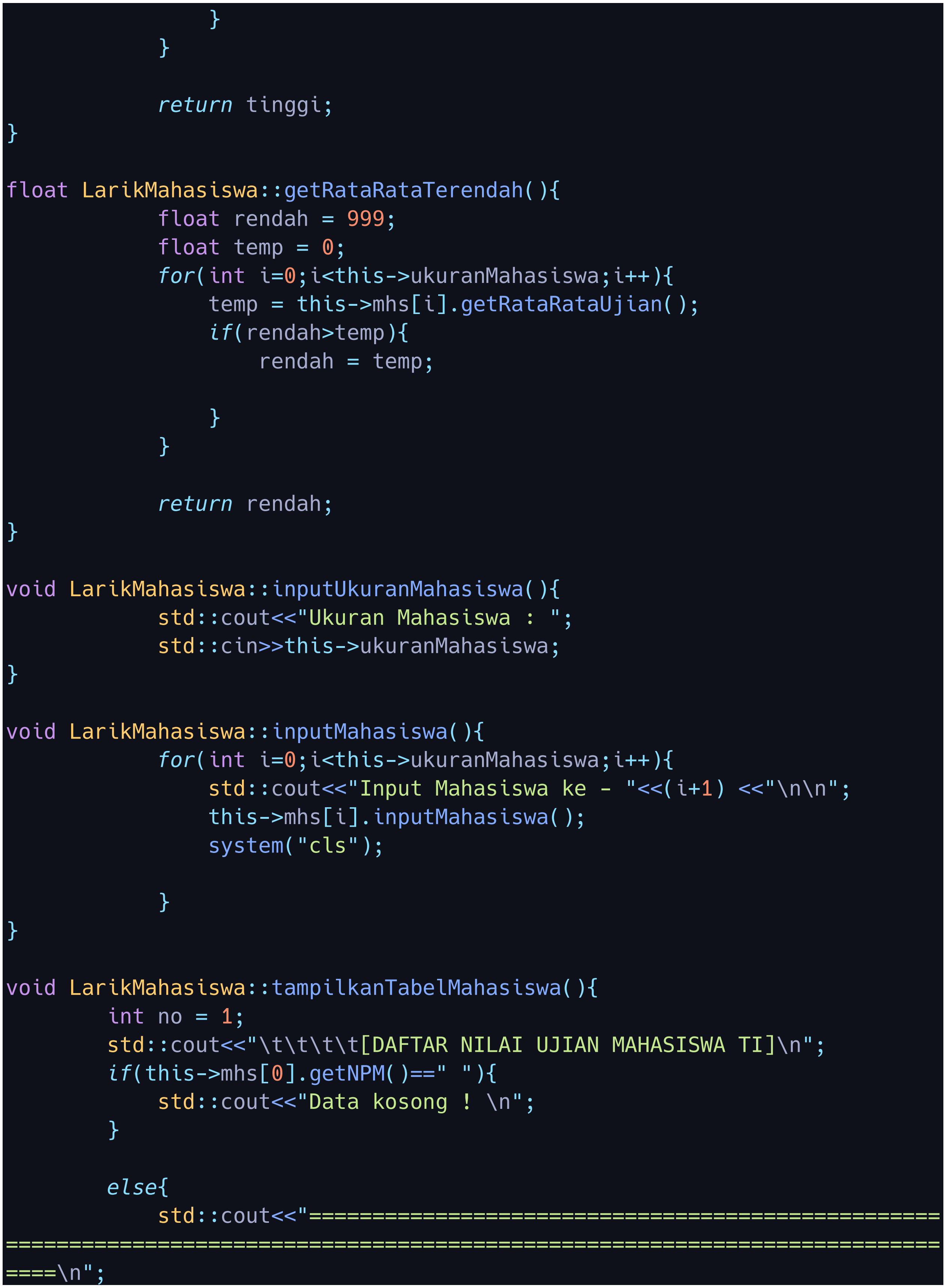
```
     std::cout<<"NPM         : " << this->NPM;
     std::cout<<"Nama        : " <<this->nama;
     std::cout<<"\n--- Nilai Ujian ---\n";
     outputKumpUjian();


     std::cout<<"Keterangan : "<<hitungKeterangan();
 }



 //Proses
float getRataRataUjian(){
 float rataRata = 0;
 for(int i=0;i<this->banyakUjian;i++){
         rataRata += kumpUjian[i].getUlangan();
 }
   rataRata = rataRata / banyakUjian;

   return rataRata;
}

float getNilaiTertinggi(){
 float tertinggi = -999;
 for(int i=0;i<this->banyakUjian;i++){
     if(tertinggi < this->kumpUjian[i].getUlangan()){
         tertinggi = this->kumpUjian[i].getUlangan();

     }
 }
   return tertinggi;
}

float getNilaiTerendah(){
 float terendah = 999;
 for(int i=0;i<this->banyakUjian;i++){
     if(terendah > this->kumpUjian[i].getUlangan()){
         terendah = this->kumpUjian[i].getUlangan();

     }
 }
   return terendah;
}

 std::string hitungKeterangan(){
```



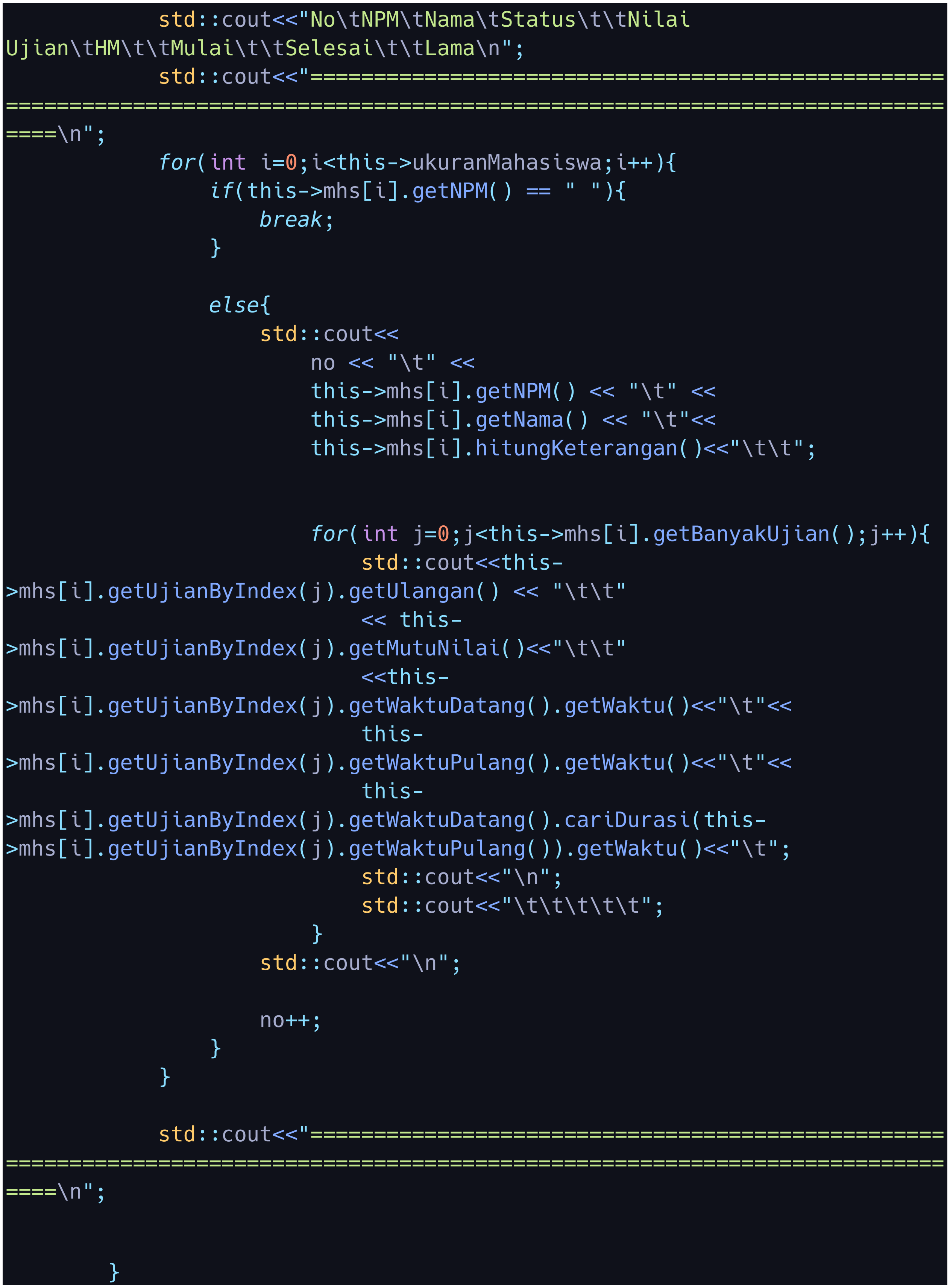
```cpp
        std::string status;

        if (getRataRataUjian() >= 55) {
            status = "LULUS";
        } else {
            status = "GAGAL";
        }

        return status;
    }
};

class LarikMahasiswa{
    private:
        int ukuranMahasiswa;
        Mahasiswa mhs[100];

    public:
        LarikMahasiswa();

        void setUkuran(int ukuranMahasiswa);

        int getUkuran();

        float getNilaiTertinggiMahasiswa();

        float getNilaiTerendahMahasiswa();

        float getRataRataTertinggi();

        float getRataRataTerendah();

        void inputUkuranMahasiswa();

        void inputMahasiswa();

        void tampilkanTabelMahasiswa();




};
LarikMahasiswa::LarikMahasiswa(){
            this->ukuranMahasiswa = 0;
}
```



```cpp
void LarikMahasiswa::setUkuran(int ukuranMahasiswa){
            this->ukuranMahasiswa = ukuranMahasiswa;
}

int LarikMahasiswa::getUkuran(){
            return this->ukuranMahasiswa;
}

float LarikMahasiswa::getNilaiTertinggiMahasiswa(){
            float tinggi = -999;
            float temp = 0;
            for(int i=0;i<this->ukuranMahasiswa;i++){
                temp = this->mhs[i].getNilaiTertinggi();
                if(tinggi<temp){
                    tinggi = temp;

                }
            }

            return tinggi;
}

float LarikMahasiswa::getNilaiTerendahMahasiswa(){
            float rendah = 999;
            float temp = 0;
            for(int i=0;i<this->ukuranMahasiswa;i++){
                temp = this->mhs[i].getNilaiTerendah();
                if(rendah>temp){
                    rendah = temp;

                }
            }

            return rendah;
}

float LarikMahasiswa::getRataRataTertinggi(){
            float tinggi = -999;
            float temp = 0;
            for(int i=0;i<this->ukuranMahasiswa;i++){
                temp = this->mhs[i].getRataRataUjian();
                if(tinggi<temp){
                    tinggi = temp;
```



```
                }
            }

            return tinggi;
}

float LarikMahasiswa::getRataRataTerendah(){
            float rendah = 999;
            float temp = 0;
            for(int i=0;i<this->ukuranMahasiswa;i++){
                temp = this->mhs[i].getRataRataUjian();
                if(rendah>temp){
                    rendah = temp;

                }
            }

            return rendah;
}

void LarikMahasiswa::inputUkuranMahasiswa(){
            std::cout<<"Ukuran Mahasiswa : ";
            std::cin>>this->ukuranMahasiswa;
}

void LarikMahasiswa::inputMahasiswa(){
            for(int i=0;i<this->ukuranMahasiswa;i++){
                std::cout<<"Input Mahasiswa ke - "<<(i+1) <<"\n\n";
                this->mhs[i].inputMahasiswa();
                system("cls");

            }
}

void LarikMahasiswa::tampilkanTabelMahasiswa(){
        int no = 1;
        std::cout<<"\t\t\t\t[DAFTAR NILAI UJIAN MAHASISWA TI]\n";
        if(this->mhs[0].getNPM()==" "){
            std::cout<<"Data kosong ! \n";
        }

        else{
            std::cout<<"==================================================
==========================================================================
====\n";
```

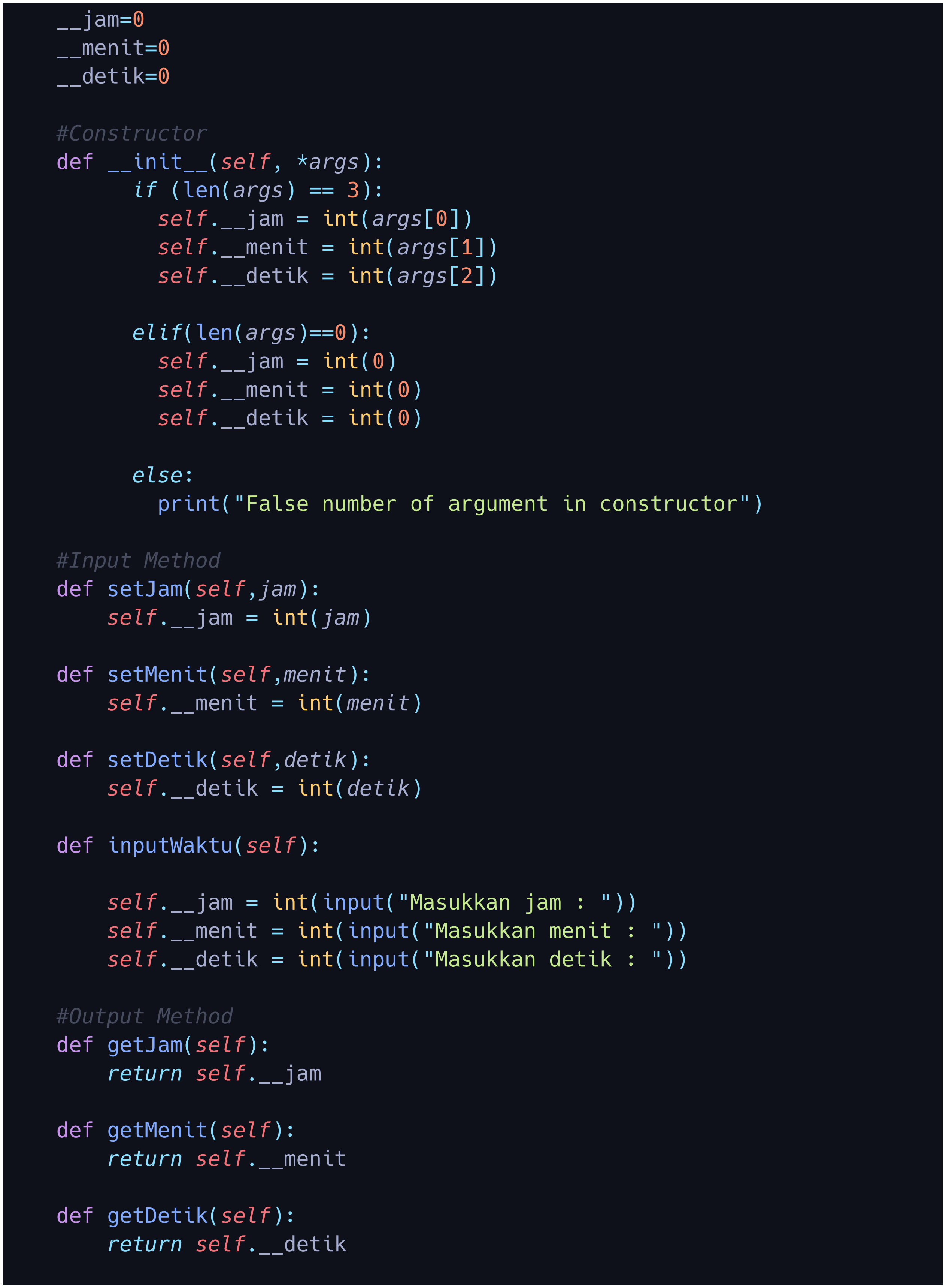


```
            std::cout<<"No\tNPM\tNama\tStatus\t\tNilai
Ujian\tHM\t\tMulai\t\tSelesai\t\tLama\n";
            std::cout<<"==================================================
==========================================================================
====\n";
            for(int i=0;i<this->ukuranMahasiswa;i++){
                if(this->mhs[i].getNPM() == " "){
                    break;
                }

                else{
                    std::cout<<
                        no << "\t" <<
                        this->mhs[i].getNPM() << "\t" <<
                        this->mhs[i].getNama() << "\t"<<
                        this->mhs[i].hitungKeterangan()<<"\t\t";


                        for(int j=0;j<this->mhs[i].getBanyakUjian();j++){
                            std::cout<<this-
>mhs[i].getUjianByIndex(j).getUlangan() << "\t\t"
                            << this-
>mhs[i].getUjianByIndex(j).getMutuNilai()<<"\t\t"
                            <<this-
>mhs[i].getUjianByIndex(j).getWaktuDatang().getWaktu()<<"\t"<<
                            this-
>mhs[i].getUjianByIndex(j).getWaktuPulang().getWaktu()<<"\t"<<
                            this-
>mhs[i].getUjianByIndex(j).getWaktuDatang().cariDurasi(this-
>mhs[i].getUjianByIndex(j).getWaktuPulang()).getWaktu()<<"\t";
                            std::cout<<"\n";
                            std::cout<<"\t\t\t\t\t";
                        }
                    std::cout<<"\n";

                    no++;
                }
            }

            std::cout<<"==================================================
==========================================================================
====\n";


        }
```

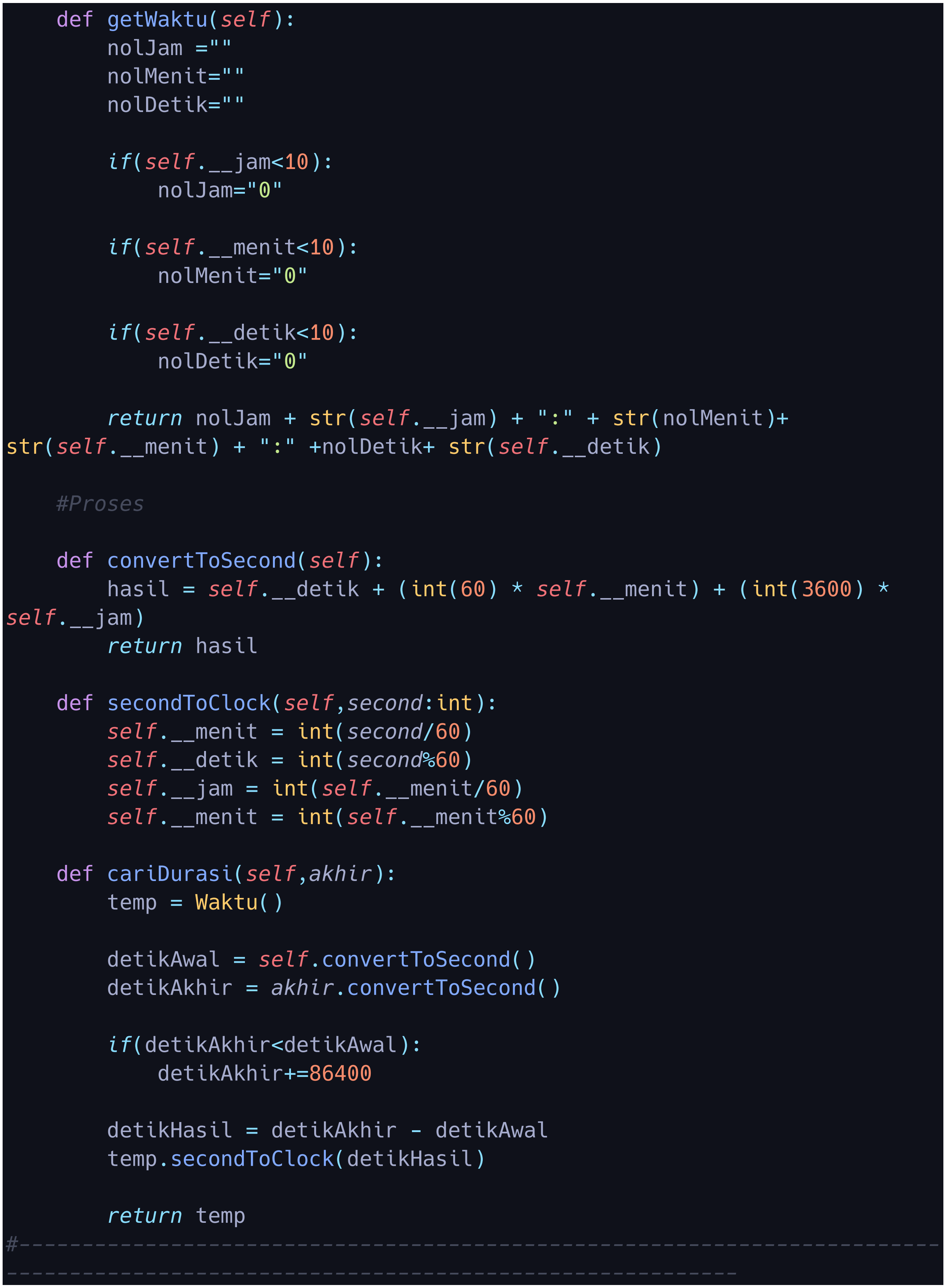
```
}


int main(int argc, char const *argv[])
{
    LarikMahasiswa lm;

    lm.inputUkuranMahasiswa();
    system("cls");

    lm.inputMahasiswa();
    system("cls");

    lm.tampilkanTabelMahasiswa();
    std::cout<<"Nilai Tertinggi :
"<<lm.getNilaiTertinggiMahasiswa()<<"\n";
    std::cout<<"Nilai Terendah : "<<lm.getNilaiTerendahMahasiswa()<<"\n";
    std::cout<<"Rata Rata Tertinggi : "<<lm.getRataRataTertinggi()<<"\n";
    std::cout<<"Rata Rata Terendah : "<<lm.getRataRataTerendah()<<"\n";





    return 0;
}
```

ii. Python

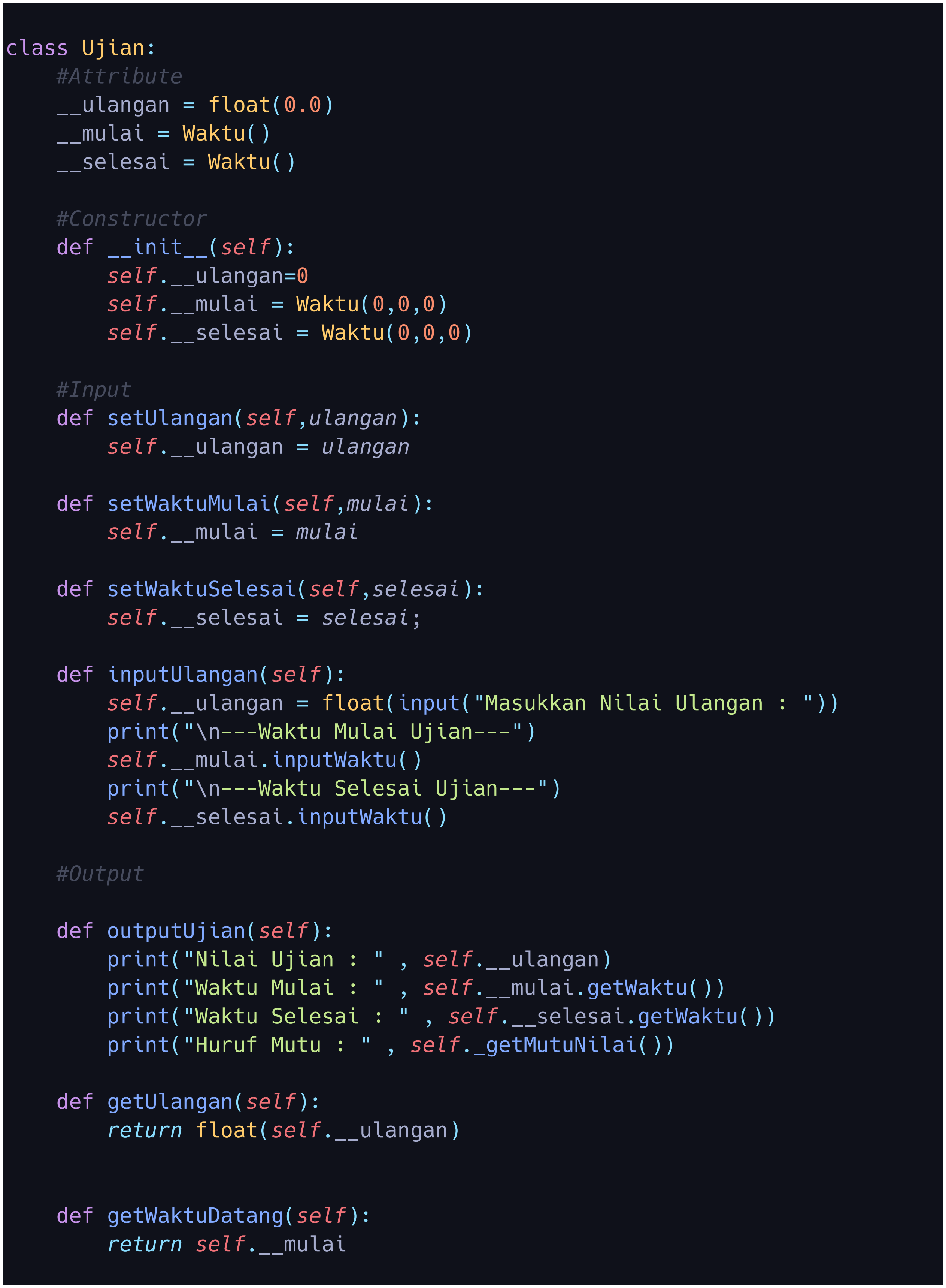
```
/*
Nama           : Amir Salim , Andre Nathaniel Adipraja , Prames Ray lapian
, Ibrahim Dafi Iskandar
NPM            : 140810210015 , 140810200042 , 140810210059 , 140810210039
Kelas          : A
Tanggal        : 19 Oktober 2022
Nama Program   : Soal1_ArrOOP.py
Deskripsi      : program untuk mencari nilai mahasiswa

*/

from os import system

class Waktu:

    #Attribute
```



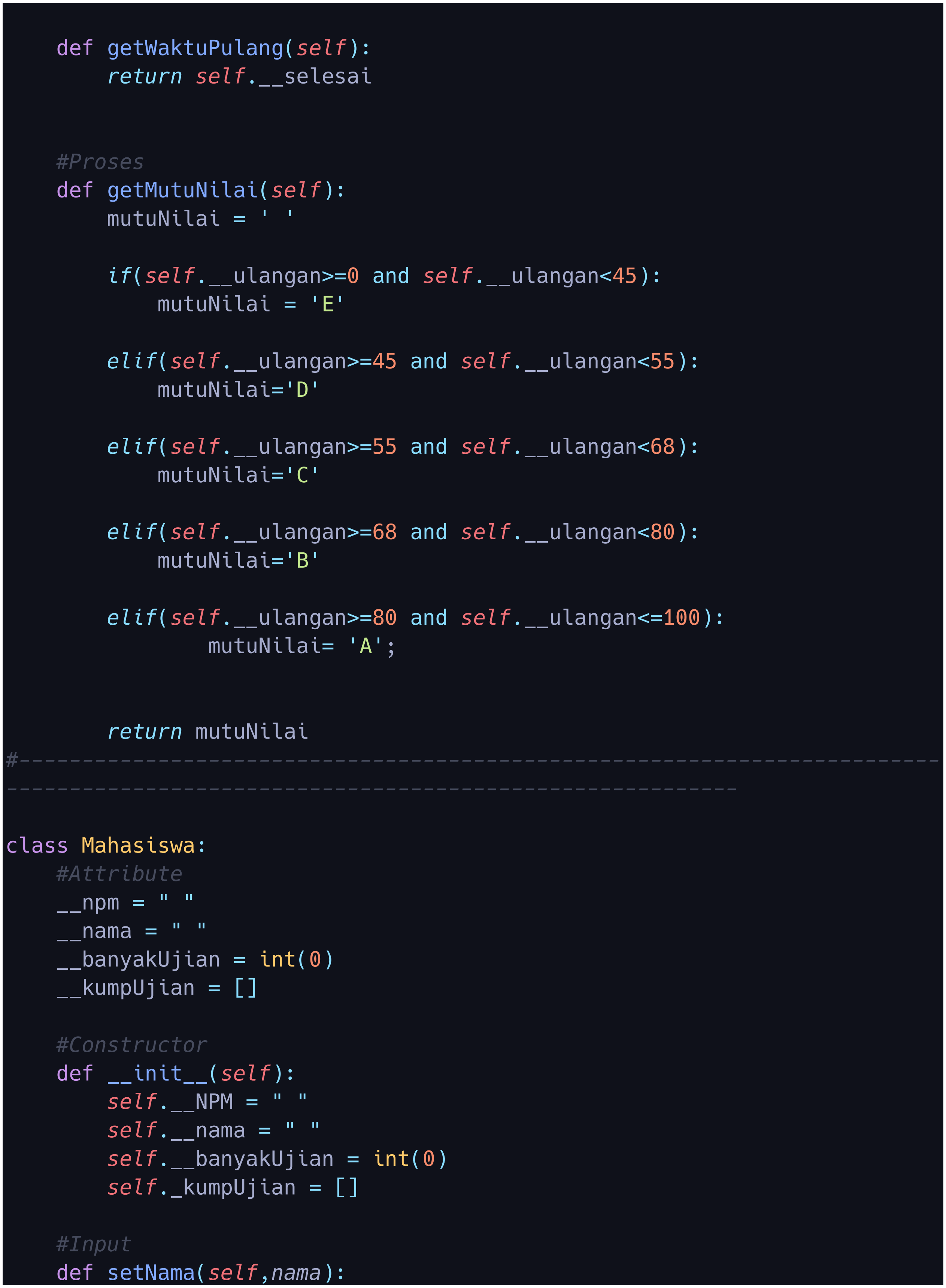
```python
    __jam=0
    __menit=0
    __detik=0

    #Constructor
    def __init__(self, *args):
          if (len(args) == 3):
            self.__jam = int(args[0])
            self.__menit = int(args[1])
            self.__detik = int(args[2])

          elif(len(args)==0):
            self.__jam = int(0)
            self.__menit = int(0)
            self.__detik = int(0)

          else:
            print("False number of argument in constructor")

    #Input Method
    def setJam(self,jam):
        self.__jam = int(jam)

    def setMenit(self,menit):
        self.__menit = int(menit)

    def setDetik(self,detik):
        self.__detik = int(detik)

    def inputWaktu(self):

        self.__jam = int(input("Masukkan jam : "))
        self.__menit = int(input("Masukkan menit : "))
        self.__detik = int(input("Masukkan detik : "))

    #Output Method
    def getJam(self):
        return self.__jam

    def getMenit(self):
        return self.__menit

    def getDetik(self):
        return self.__detik
```



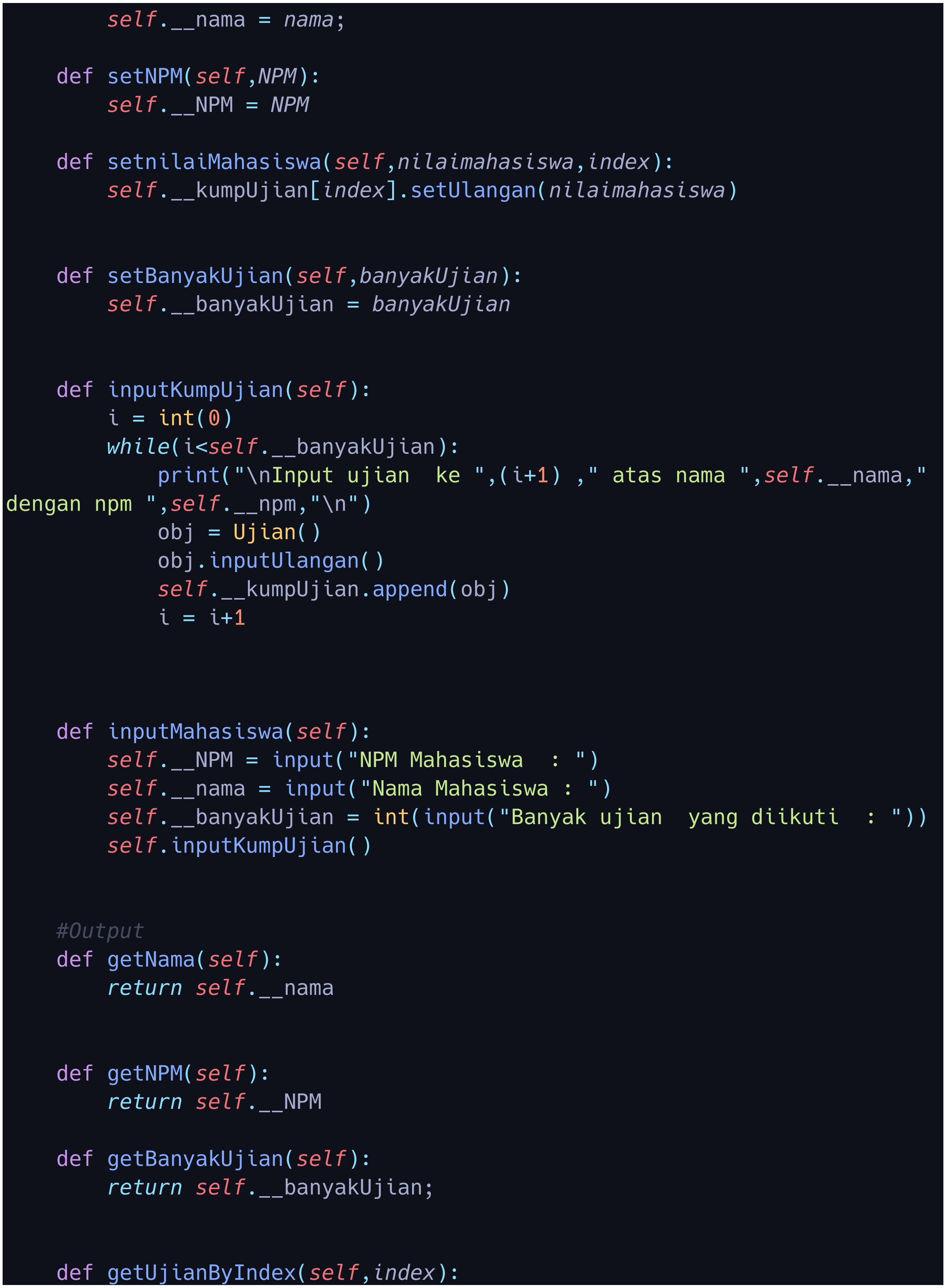
```
    def getWaktu(self):
        nolJam =""
        nolMenit=""
        nolDetik=""

        if(self.__jam<10):
            nolJam="0"

        if(self.__menit<10):
            nolMenit="0"

        if(self.__detik<10):
            nolDetik="0"

        return nolJam + str(self.__jam) + ":" + str(nolMenit)+
str(self.__menit) + ":" +nolDetik+ str(self.__detik)

    #Proses

    def convertToSecond(self):
        hasil = self.__detik + (int(60) * self.__menit) + (int(3600) *
self.__jam)
        return hasil

    def secondToClock(self,second:int):
        self.__menit = int(second/60)
        self.__detik = int(second%60)
        self.__jam = int(self.__menit/60)
        self.__menit = int(self.__menit%60)

    def cariDurasi(self,akhir):
        temp = Waktu()

        detikAwal = self.convertToSecond()
        detikAkhir = akhir.convertToSecond()

        if(detikAkhir<detikAwal):
            detikAkhir+=86400

        detikHasil = detikAkhir - detikAwal
        temp.secondToClock(detikHasil)

        return temp
#--------------------------------------------------------------------------
----------------------------------------------------------
```



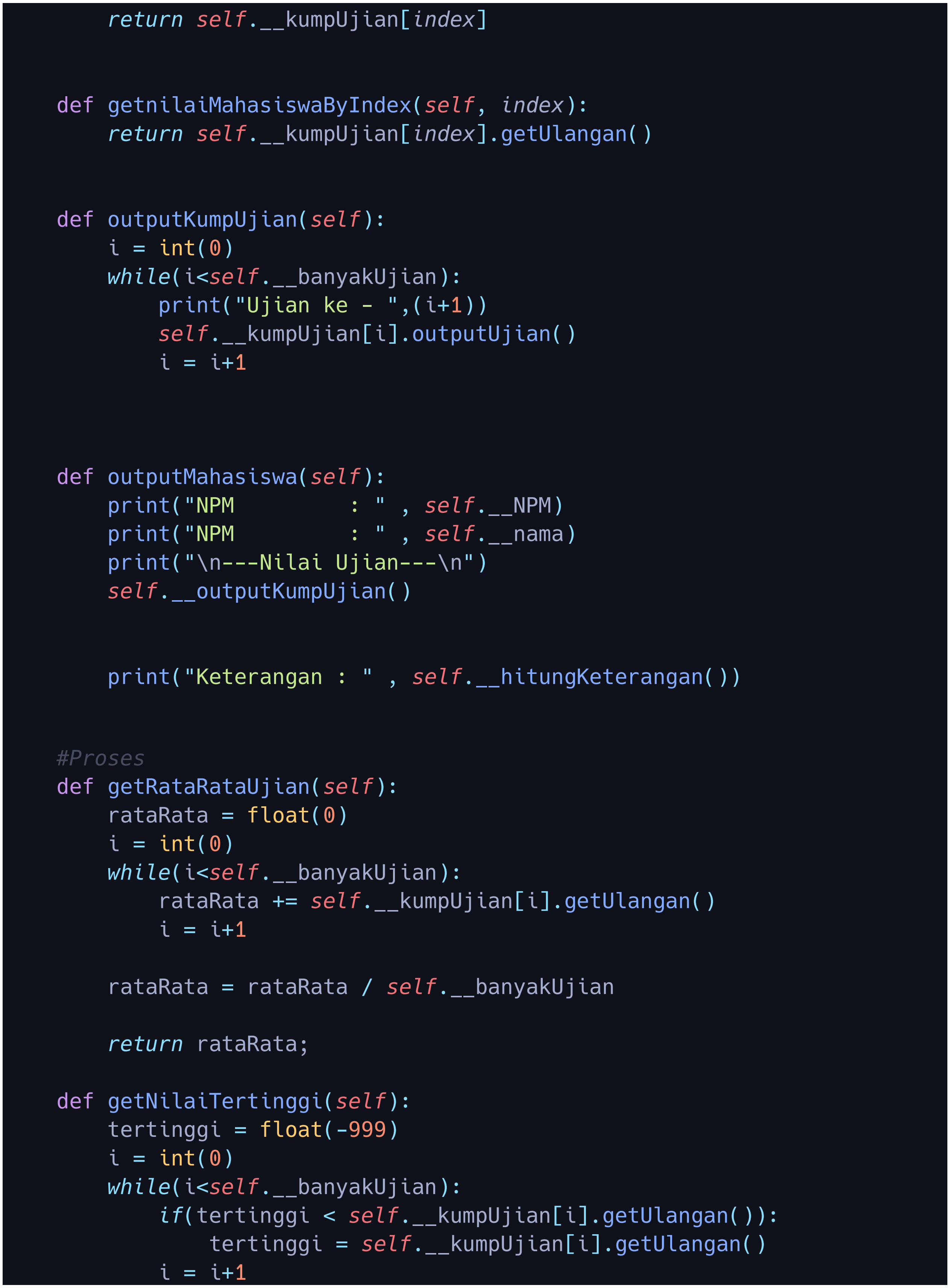
```python
class Ujian:
    #Attribute
    __ulangan = float(0.0)
    __mulai = Waktu()
    __selesai = Waktu()

    #Constructor
    def __init__(self):
        self.__ulangan=0
        self.__mulai = Waktu(0,0,0)
        self.__selesai = Waktu(0,0,0)

    #Input
    def setUlangan(self,ulangan):
        self.__ulangan = ulangan

    def setWaktuMulai(self,mulai):
        self.__mulai = mulai

    def setWaktuSelesai(self,selesai):
        self.__selesai = selesai;

    def inputUlangan(self):
        self.__ulangan = float(input("Masukkan Nilai Ulangan : "))
        print("\n---Waktu Mulai Ujian---")
        self.__mulai.inputWaktu()
        print("\n---Waktu Selesai Ujian---")
        self.__selesai.inputWaktu()

    #Output

    def outputUjian(self):
        print("Nilai Ujian : " , self.__ulangan)
        print("Waktu Mulai : " , self.__mulai.getWaktu())
        print("Waktu Selesai : " , self.__selesai.getWaktu())
        print("Huruf Mutu : " , self._getMutuNilai())

    def getUlangan(self):
        return float(self.__ulangan)


    def getWaktuDatang(self):
        return self.__mulai
```



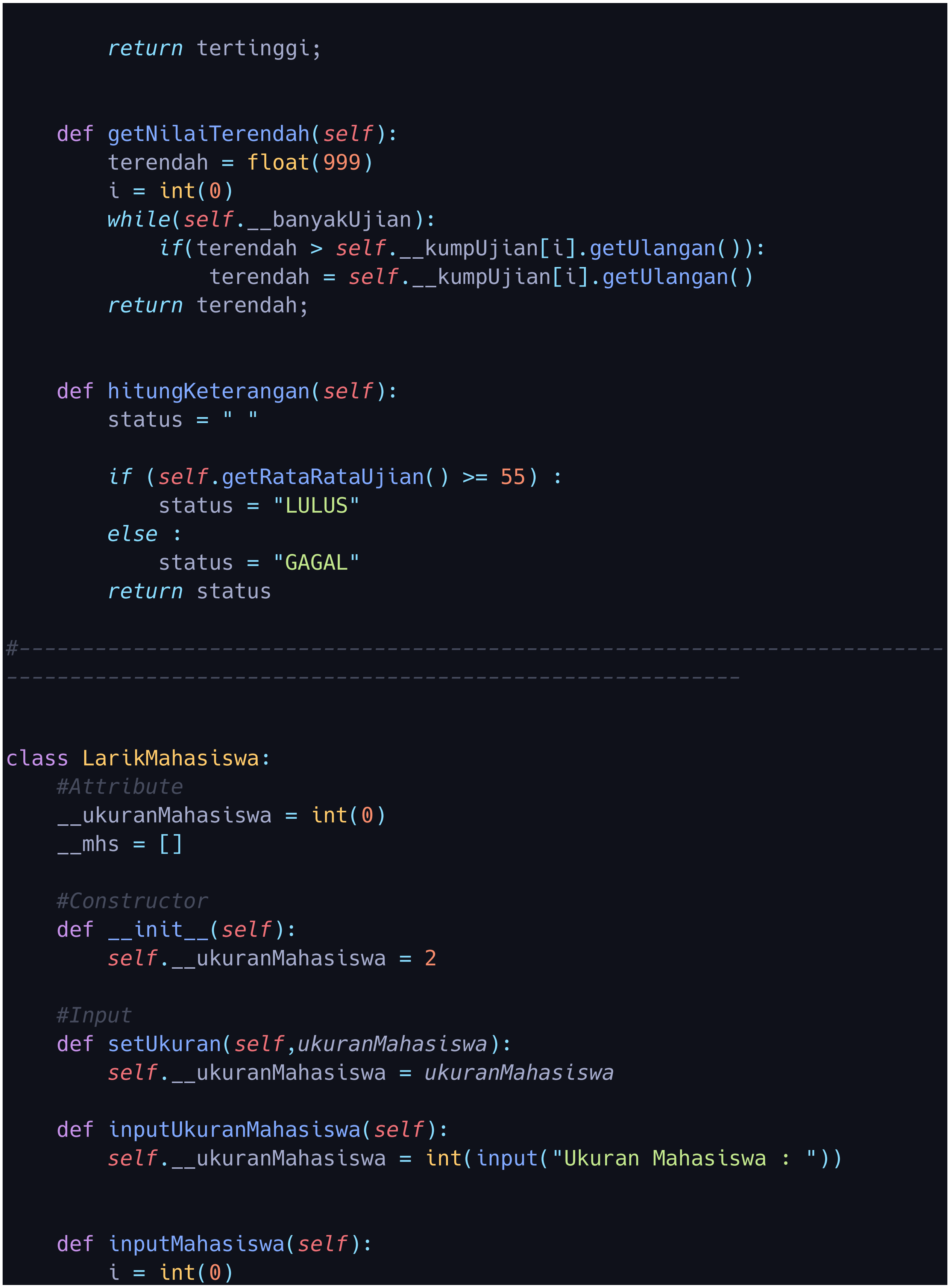
```
    def getWaktuPulang(self):
        return self.__selesai


    #Proses
    def getMutuNilai(self):
        mutuNilai = ' '

        if(self.__ulangan>=0 and self.__ulangan<45):
            mutuNilai = 'E'

        elif(self.__ulangan>=45 and self.__ulangan<55):
            mutuNilai='D'

        elif(self.__ulangan>=55 and self.__ulangan<68):
            mutuNilai='C'

        elif(self.__ulangan>=68 and self.__ulangan<80):
            mutuNilai='B'

        elif(self.__ulangan>=80 and self.__ulangan<=100):
                mutuNilai= 'A';


        return mutuNilai
#-------------------------------------------------------------------------
----------------------------------------------------------

class Mahasiswa:
    #Attribute
    __npm = " "
    __nama = " "
    __banyakUjian = int(0)
    __kumpUjian = []

    #Constructor
    def __init__(self):
        self.__NPM = " "
        self.__nama = " "
        self.__banyakUjian = int(0)
        self._kumpUjian = []

    #Input
    def setNama(self,nama):
```



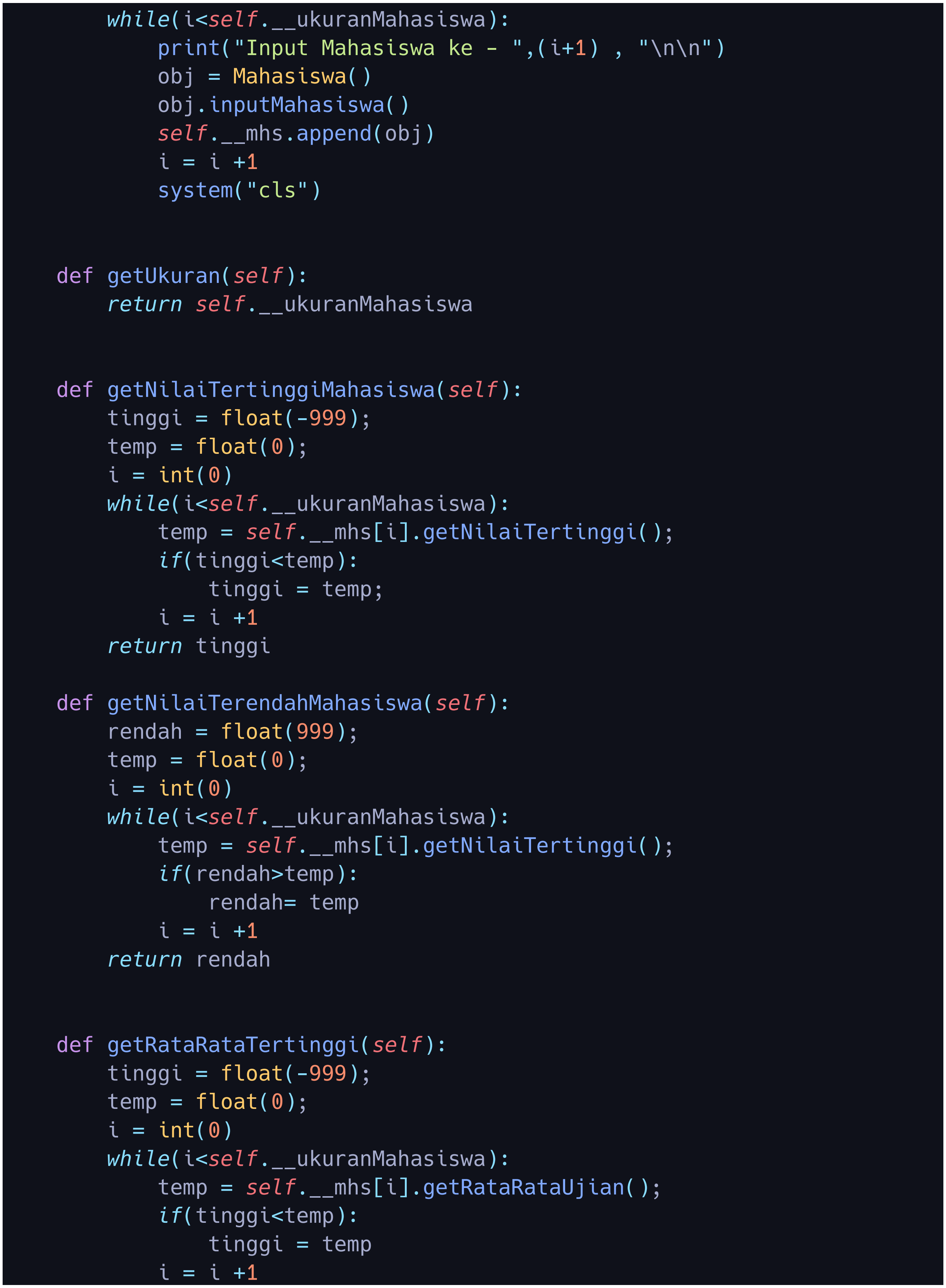
```
        self.__nama = nama;

    def setNPM(self,NPM):
        self.__NPM = NPM

    def setnilaiMahasiswa(self,nilaimahasiswa,index):
        self.__kumpUjian[index].setUlangan(nilaimahasiswa)


    def setBanyakUjian(self,banyakUjian):
        self.__banyakUjian = banyakUjian


    def inputKumpUjian(self):
        i = int(0)
        while(i<self.__banyakUjian):
            print("\nInput ujian  ke ",(i+1) ," atas nama ",self.__nama,"
dengan npm ",self.__npm,"\n")
            obj = Ujian()
            obj.inputUlangan()
            self.__kumpUjian.append(obj)
            i = i+1



    def inputMahasiswa(self):
        self.__NPM = input("NPM Mahasiswa  : ")
        self.__nama = input("Nama Mahasiswa : ")
        self.__banyakUjian = int(input("Banyak ujian  yang diikuti  : "))
        self.inputKumpUjian()


    #Output
    def getNama(self):
        return self.__nama


    def getNPM(self):
        return self.__NPM

    def getBanyakUjian(self):
        return self.__banyakUjian;


    def getUjianByIndex(self,index):
```



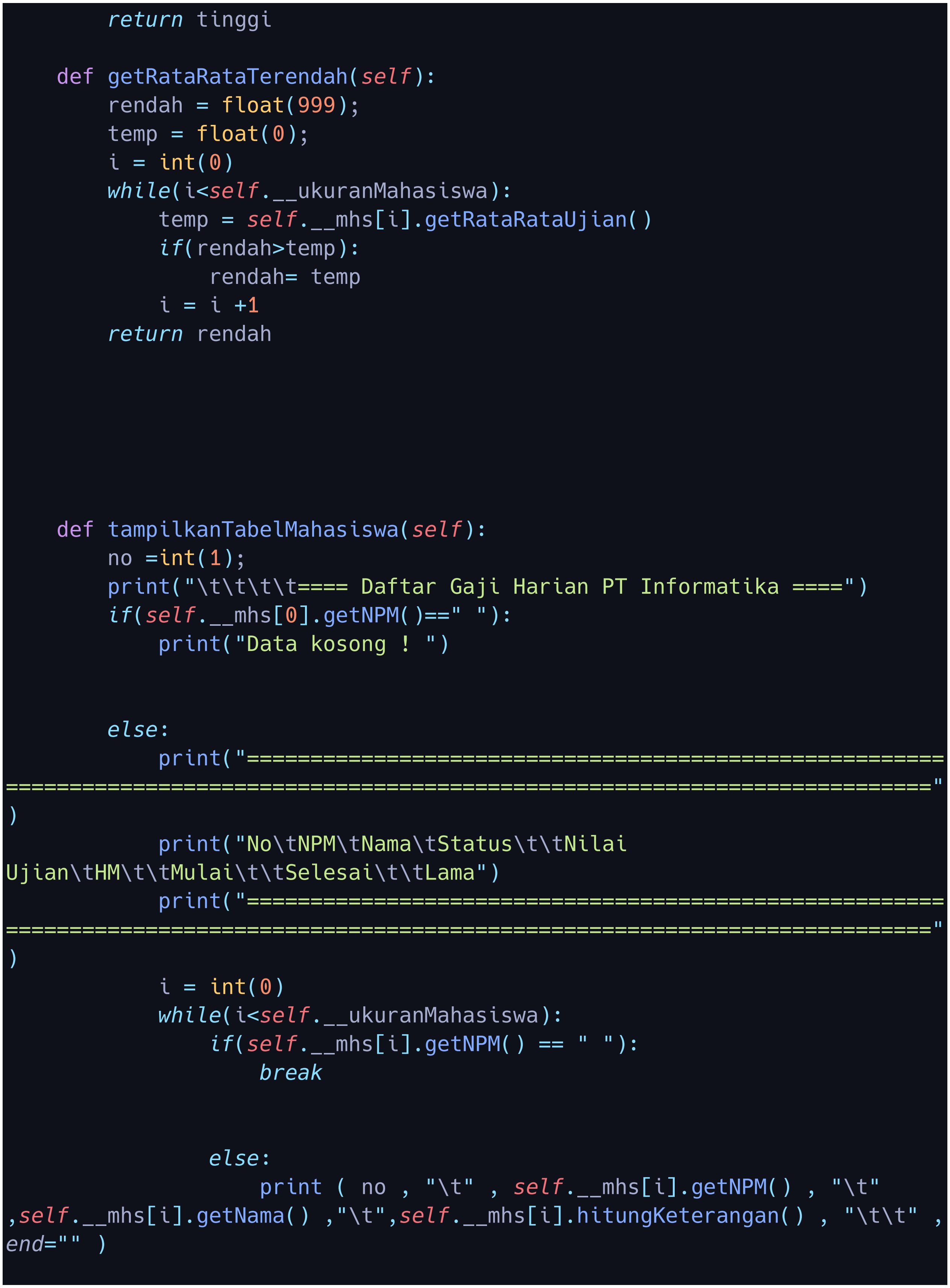
```
        return self.__kumpUjian[index]


    def getnilaiMahasiswaByIndex(self, index):
        return self.__kumpUjian[index].getUlangan()


    def outputKumpUjian(self):
        i = int(0)
        while(i<self.__banyakUjian):
            print("Ujian ke - ",(i+1))
            self.__kumpUjian[i].outputUjian()
            i = i+1



    def outputMahasiswa(self):
        print("NPM         : " , self.__NPM)
        print("NPM         : " , self.__nama)
        print("\n---Nilai Ujian---\n")
        self.__outputKumpUjian()


        print("Keterangan : " , self.__hitungKeterangan())


    #Proses
    def getRataRataUjian(self):
        rataRata = float(0)
        i = int(0)
        while(i<self.__banyakUjian):
            rataRata += self.__kumpUjian[i].getUlangan()
            i = i+1

        rataRata = rataRata / self.__banyakUjian

        return rataRata;

    def getNilaiTertinggi(self):
        tertinggi = float(-999)
        i = int(0)
        while(i<self.__banyakUjian):
            if(tertinggi < self.__kumpUjian[i].getUlangan()):
                tertinggi = self.__kumpUjian[i].getUlangan()
            i = i+1
```



```
        return tertinggi;


    def getNilaiTerendah(self):
        terendah = float(999)
        i = int(0)
        while(self.__banyakUjian):
            if(terendah > self.__kumpUjian[i].getUlangan()):
                terendah = self.__kumpUjian[i].getUlangan()
        return terendah;


    def hitungKeterangan(self):
        status = " "

        if (self.getRataRataUjian() >= 55) :
            status = "LULUS"
        else :
            status = "GAGAL"
        return status

#-------------------------------------------------------------------------
----------------------------------------------------------


class LarikMahasiswa:
    #Attribute
    __ukuranMahasiswa = int(0)
    __mhs = []

    #Constructor
    def __init__(self):
        self.__ukuranMahasiswa = 2

    #Input
    def setUkuran(self,ukuranMahasiswa):
        self.__ukuranMahasiswa = ukuranMahasiswa

    def inputUkuranMahasiswa(self):
        self.__ukuranMahasiswa = int(input("Ukuran Mahasiswa : "))


    def inputMahasiswa(self):
        i = int(0)
```



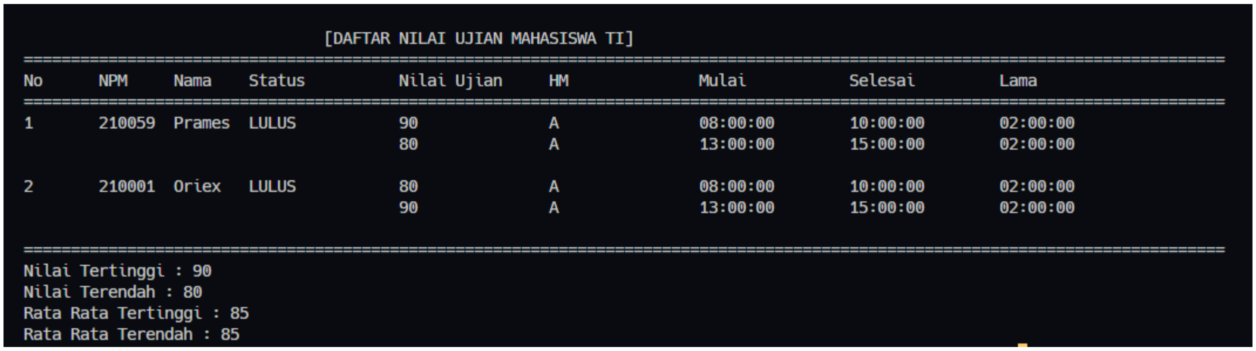
```
        while(i<self.__ukuranMahasiswa):
            print("Input Mahasiswa ke - ",(i+1) , "\n\n")
            obj = Mahasiswa()
            obj.inputMahasiswa()
            self.__mhs.append(obj)
            i = i +1
            system("cls")


    def getUkuran(self):
        return self.__ukuranMahasiswa


    def getNilaiTertinggiMahasiswa(self):
        tinggi = float(-999);
        temp = float(0);
        i = int(0)
        while(i<self.__ukuranMahasiswa):
            temp = self.__mhs[i].getNilaiTertinggi();
            if(tinggi<temp):
                tinggi = temp;
            i = i +1
        return tinggi

    def getNilaiTerendahMahasiswa(self):
        rendah = float(999);
        temp = float(0);
        i = int(0)
        while(i<self.__ukuranMahasiswa):
            temp = self.__mhs[i].getNilaiTertinggi();
            if(rendah>temp):
                rendah= temp
            i = i +1
        return rendah


    def getRataRataTertinggi(self):
        tinggi = float(-999);
        temp = float(0);
        i = int(0)
        while(i<self.__ukuranMahasiswa):
            temp = self.__mhs[i].getRataRataUjian();
            if(tinggi<temp):
                tinggi = temp
            i = i +1
```



```
        return tinggi

    def getRataRataTerendah(self):
        rendah = float(999);
        temp = float(0);
        i = int(0)
        while(i<self.__ukuranMahasiswa):
            temp = self.__mhs[i].getRataRataUjian()
            if(rendah>temp):
                rendah= temp
            i = i +1
        return rendah






    def tampilkanTabelMahasiswa(self):
        no =int(1);
        print("\t\t\t\t==== Daftar Gaji Harian PT Informatika ====")
        if(self.__mhs[0].getNPM()==" "):
            print("Data kosong ! ")


        else:
            print("=======================================================
========================================================================="
)
            print("No\tNPM\tNama\tStatus\t\tNilai
Ujian\tHM\t\tMulai\t\tSelesai\t\tLama")
            print("=======================================================
========================================================================="
)
            i = int(0)
            while(i<self.__ukuranMahasiswa):
                if(self.__mhs[i].getNPM() == " "):
                    break


                else:
                    print ( no , "\t" , self.__mhs[i].getNPM() , "\t"
,self.__mhs[i].getNama() ,"\t",self.__mhs[i].hitungKeterangan() , "\t\t" ,
end="" )
```

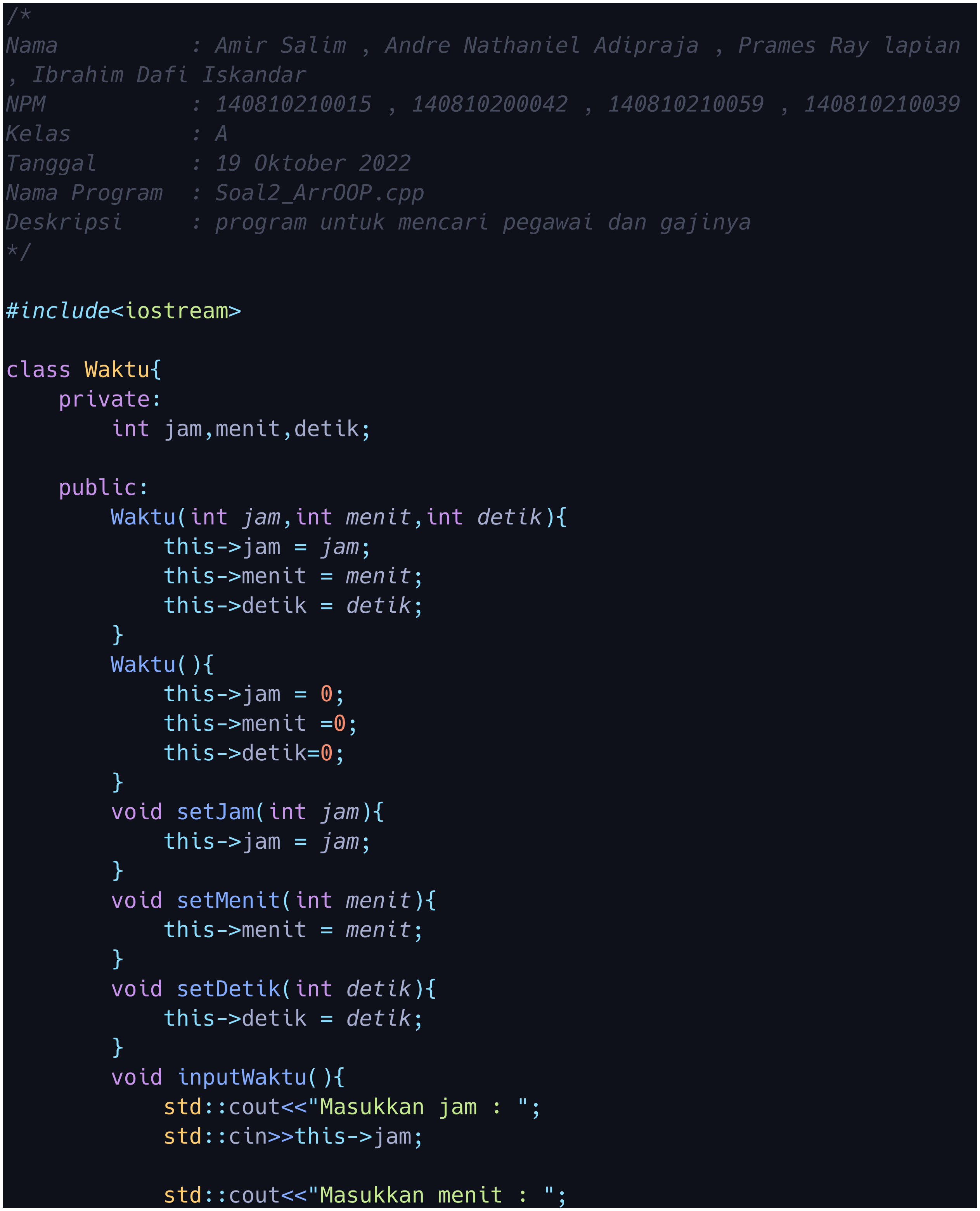
```
                    j = int(0)


                    while(j<self.__mhs[i].getBanyakUjian()):

                        print(self.__mhs[i].getUjianByIndex(j).getUlangan(
) , "\t\t"
                            ,
self.__mhs[i].getUjianByIndex(j).getMutuNilai(),"\t\t"
                            ,self.__mhs[i].getUjianByIndex(j).getWaktuData
ng().getWaktu(),"\t",
                            self.__mhs[i].getUjianByIndex(j).getWaktuPulan
g().getWaktu(),"\t",
                            self.__mhs[i].getUjianByIndex(j).getWaktuDatan
g().cariDurasi(self.__mhs[i].getUjianByIndex(j).getWaktuPulang()).getWaktu
(),"\t")

                        print("\t\t\t\t\t\t",end="")
                        j= j +1

                    print("\n")

                    no = no+1

                i = i+1
            print("=======================================================
========================================================================="
)

#-------------------------------------------------------------------------
----------------------------------------------------------

lm = LarikMahasiswa()

lm.inputUkuranMahasiswa()
system("cls")

lm.inputMahasiswa()
system("cls")

lm.tampilkanTabelMahasiswa();
print("Nilai Tertinggi : ",lm.getNilaiTertinggiMahasiswa())
print("Nilai Terendah : ",lm.getNilaiTerendahMahasiswa())
print("Rata Rata Tertinggi : ",lm.getRataRataTertinggi())
print("Rata Rata Terendah : ",lm.getRataRataTerendah())
```

b. Screenshot:

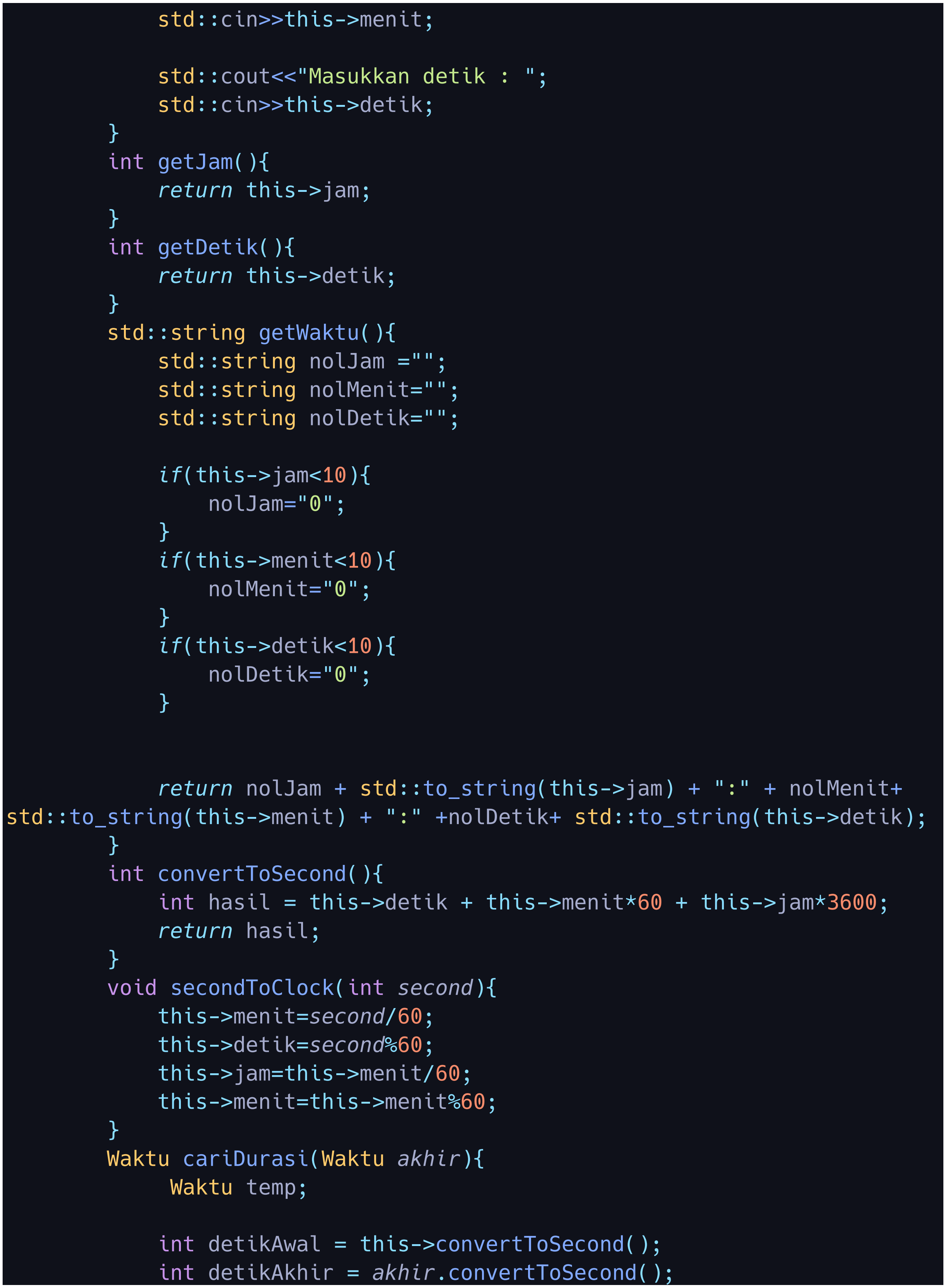


```
                                [DAFTAR NILAI UJIAN MAHASISWA TI]
================================================================================================================================
No      NPM     Nama    Status          Nilai Ujian     HM              Mulai           Selesai         Lama
================================================================================================================================
1       210059  Prames  LULUS           90              A               08:00:00        10:00:00        02:00:00
                                        80              A               13:00:00        15:00:00        02:00:00

2       210001  Oriex   LULUS           80              A               08:00:00        10:00:00        02:00:00
                                        90              A               13:00:00        15:00:00        02:00:00

================================================================================================================================
Nilai Tertinggi : 90
Nilai Terendah : 80
Rata Rata Tertinggi : 85
Rata Rata Terendah : 85
```

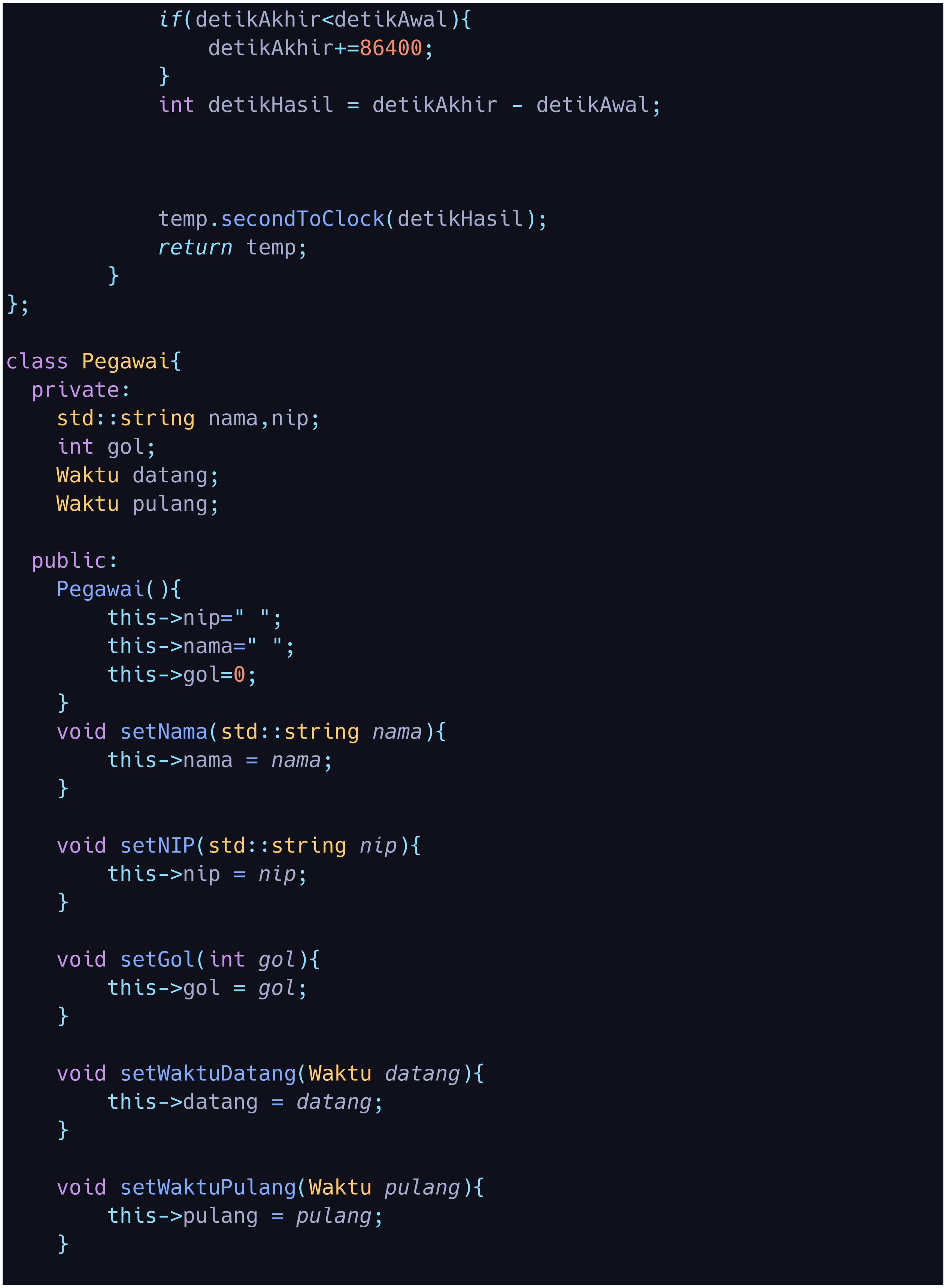
2. Soal 2
    a. Source Code:
        i. C++



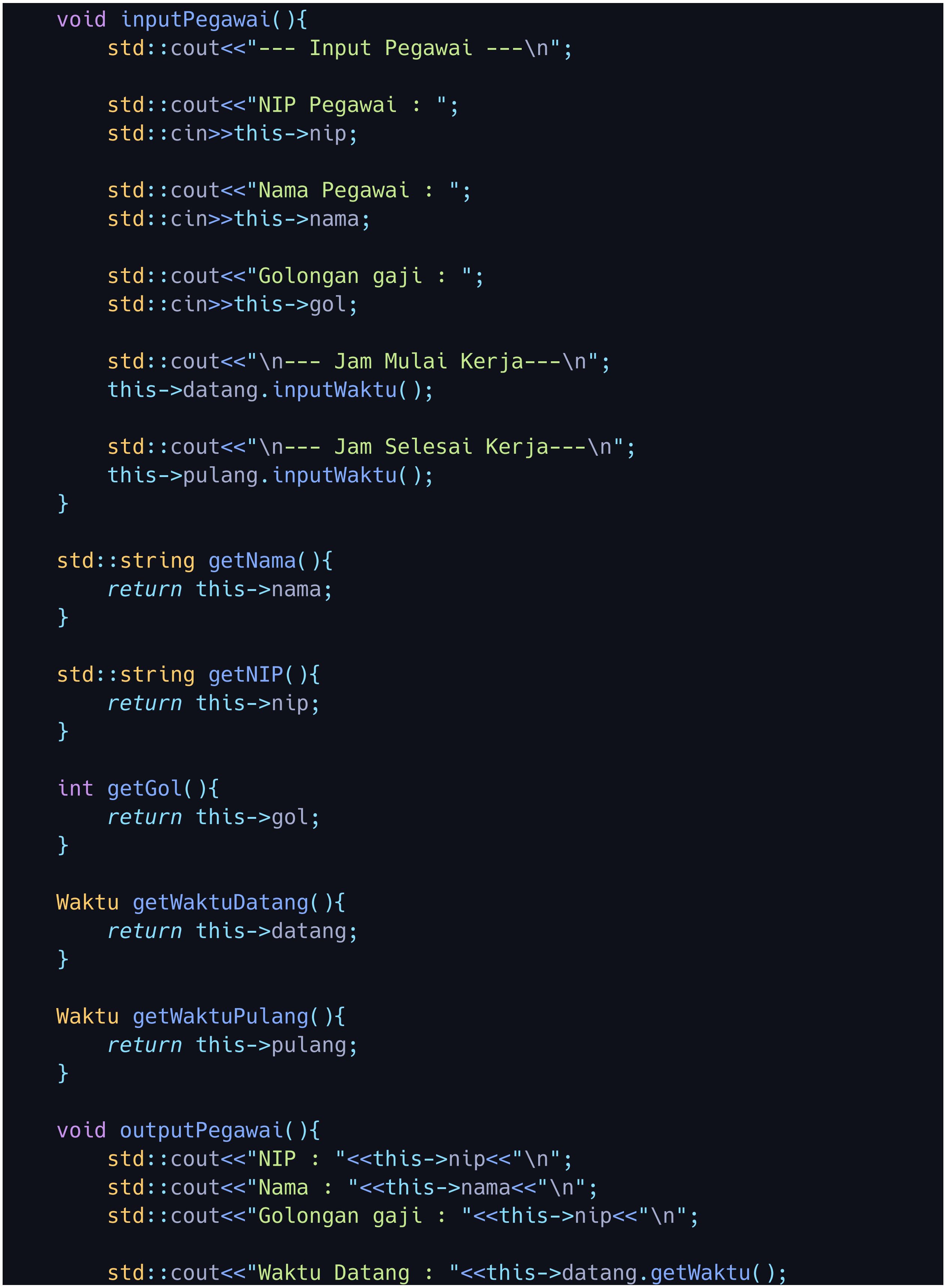
```
/*
Nama          : Amir Salim , Andre Nathaniel Adipraja , Prames Ray lapian
, Ibrahim Dafi Iskandar
NPM           : 140810210015 , 140810200042 , 140810210059 , 140810210039
Kelas         : A
Tanggal       : 19 Oktober 2022
Nama Program  : Soal2_ArrOOP.cpp
Deskripsi     : program untuk mencari pegawai dan gajinya
*/

#include<iostream>

class Waktu{
    private:
        int jam,menit,detik;

    public:
        Waktu(int jam,int menit,int detik){
            this->jam = jam;
            this->menit = menit;
            this->detik = detik;
        }
        Waktu(){
            this->jam = 0;
            this->menit =0;
            this->detik=0;
        }
        void setJam(int jam){
            this->jam = jam;
        }
        void setMenit(int menit){
            this->menit = menit;
        }
        void setDetik(int detik){
            this->detik = detik;
        }
        void inputWaktu(){
            std::cout<<"Masukkan jam : ";
            std::cin>>this->jam;

            std::cout<<"Masukkan menit : ";
```



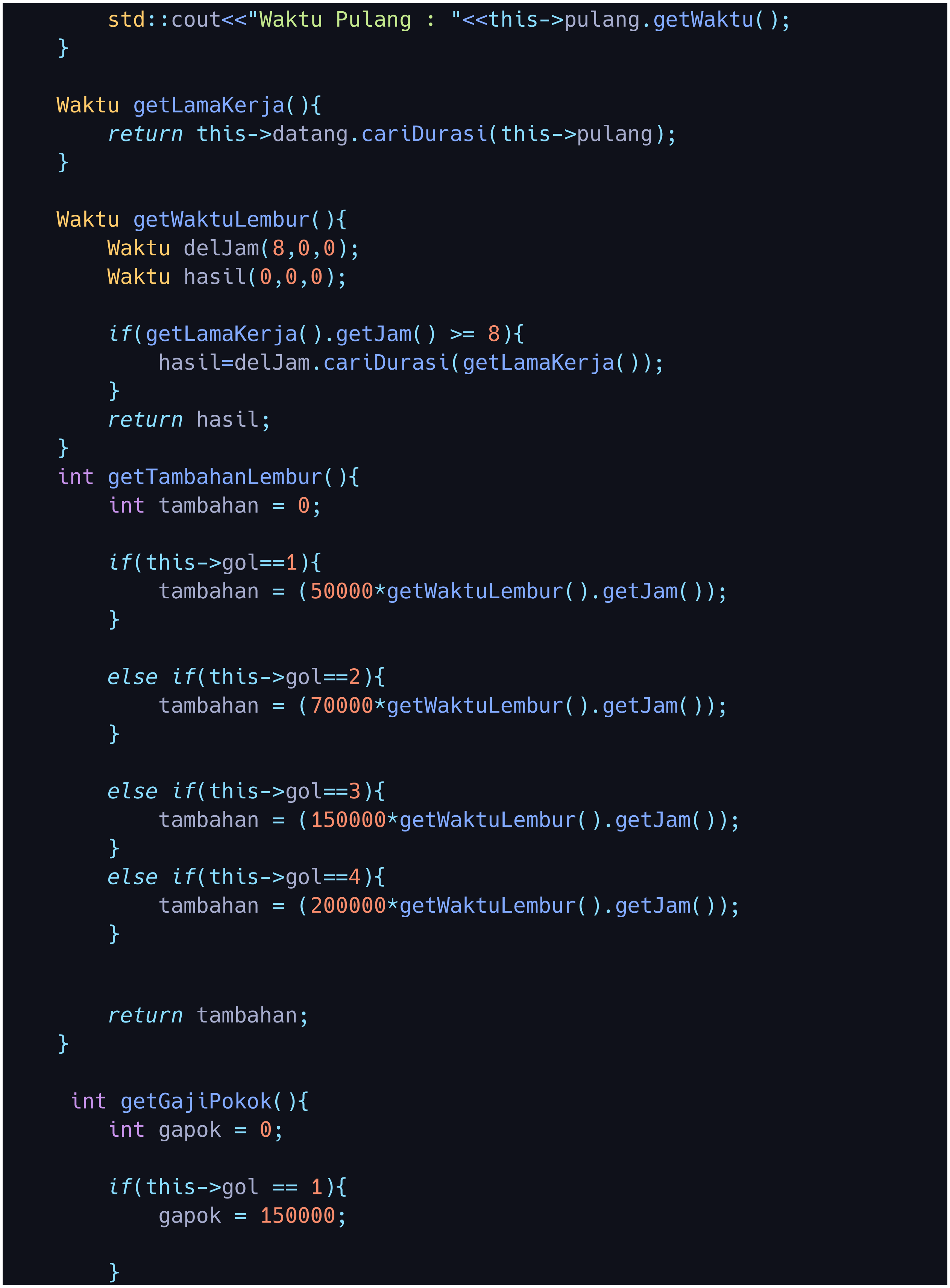
```
            std::cin>>this->menit;

            std::cout<<"Masukkan detik : ";
            std::cin>>this->detik;
        }
        int getJam(){
            return this->jam;
        }
        int getDetik(){
            return this->detik;
        }
        std::string getWaktu(){
            std::string nolJam ="";
            std::string nolMenit="";
            std::string nolDetik="";

            if(this->jam<10){
                nolJam="0";
            }
            if(this->menit<10){
                nolMenit="0";
            }
            if(this->detik<10){
                nolDetik="0";
            }


            return nolJam + std::to_string(this->jam) + ":" + nolMenit+
std::to_string(this->menit) + ":" +nolDetik+ std::to_string(this->detik);
        }
        int convertToSecond(){
            int hasil = this->detik + this->menit*60 + this->jam*3600;
            return hasil;
        }
        void secondToClock(int second){
            this->menit=second/60;
            this->detik=second%60;
            this->jam=this->menit/60;
            this->menit=this->menit%60;
        }
        Waktu cariDurasi(Waktu akhir){
             Waktu temp;

            int detikAwal = this->convertToSecond();
            int detikAkhir = akhir.convertToSecond();
```



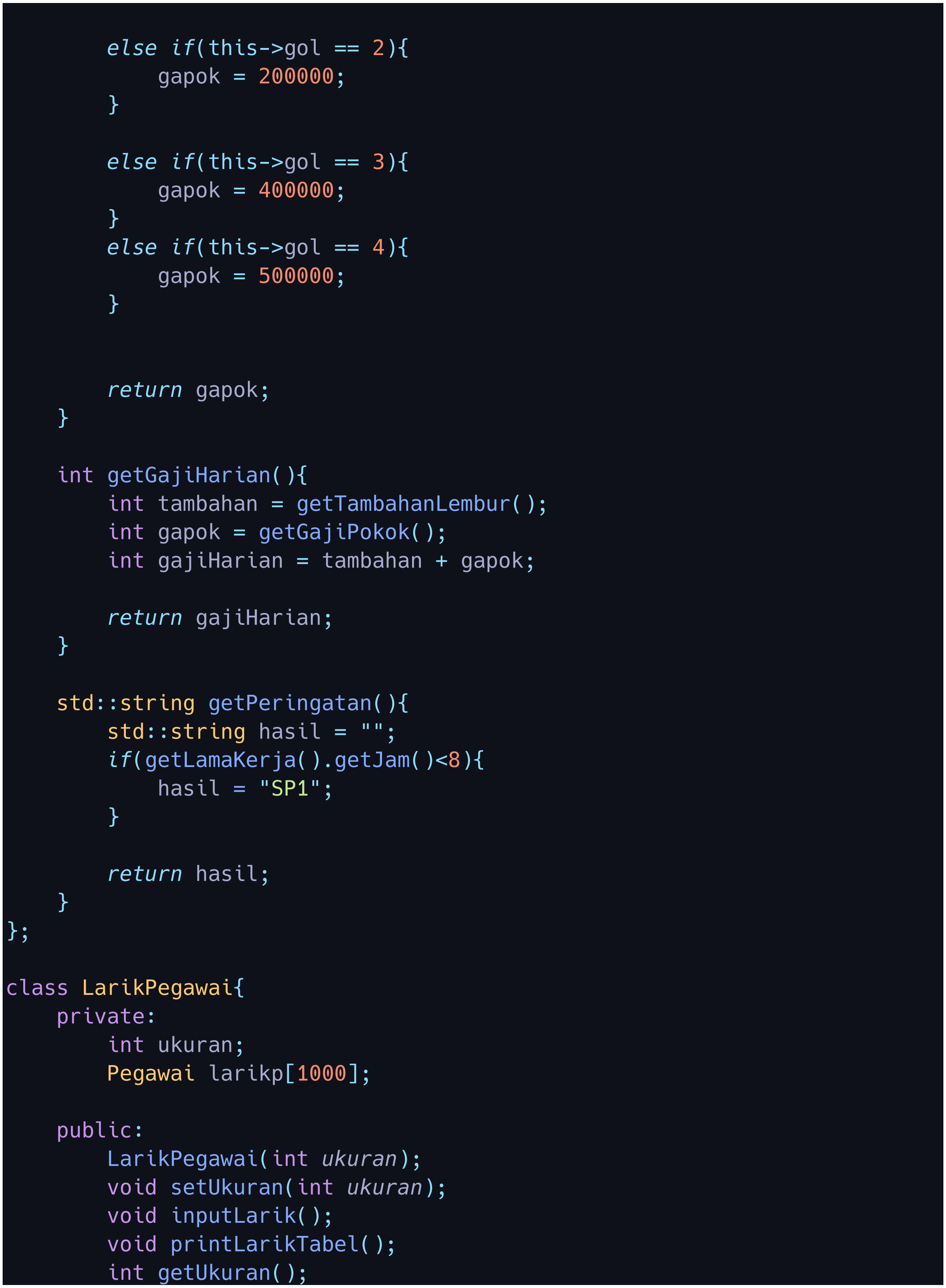
```
            if(detikAkhir<detikAwal){
                detikAkhir+=86400;
            }
            int detikHasil = detikAkhir - detikAwal;



            temp.secondToClock(detikHasil);
            return temp;
        }
};

class Pegawai{
  private:
    std::string nama,nip;
    int gol;
    Waktu datang;
    Waktu pulang;

  public:
    Pegawai(){
        this->nip=" ";
        this->nama=" ";
        this->gol=0;
    }
    void setNama(std::string nama){
        this->nama = nama;
    }

    void setNIP(std::string nip){
        this->nip = nip;
    }

    void setGol(int gol){
        this->gol = gol;
    }

    void setWaktuDatang(Waktu datang){
        this->datang = datang;
    }

    void setWaktuPulang(Waktu pulang){
        this->pulang = pulang;
    }
```



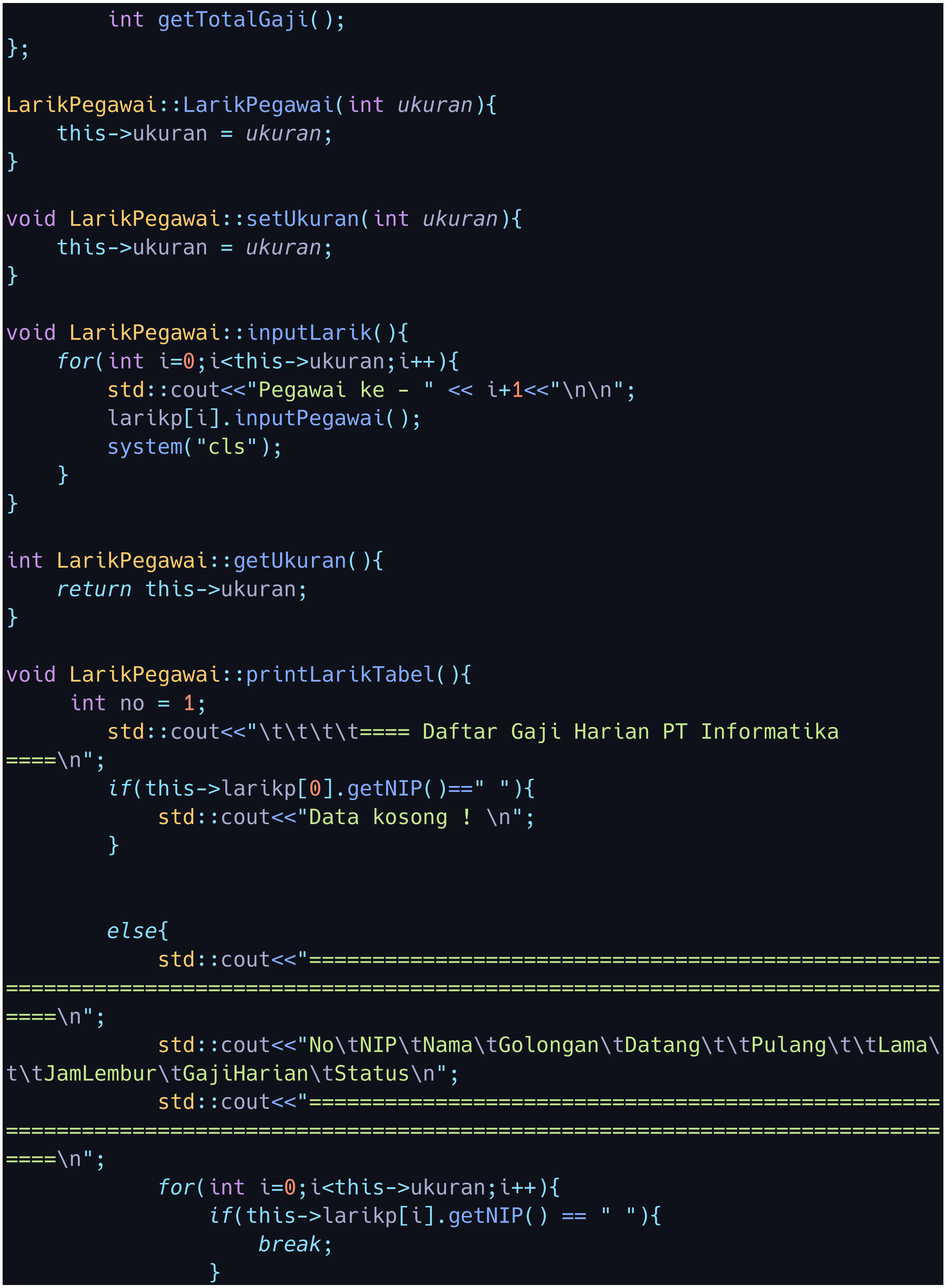
```
    void inputPegawai(){
        std::cout<<"--- Input Pegawai ---\n";

        std::cout<<"NIP Pegawai : ";
        std::cin>>this->nip;

        std::cout<<"Nama Pegawai : ";
        std::cin>>this->nama;

        std::cout<<"Golongan gaji : ";
        std::cin>>this->gol;

        std::cout<<"\n--- Jam Mulai Kerja---\n";
        this->datang.inputWaktu();

        std::cout<<"\n--- Jam Selesai Kerja---\n";
        this->pulang.inputWaktu();
    }

    std::string getNama(){
        return this->nama;
    }

    std::string getNIP(){
        return this->nip;
    }

    int getGol(){
        return this->gol;
    }

    Waktu getWaktuDatang(){
        return this->datang;
    }

    Waktu getWaktuPulang(){
        return this->pulang;
    }

    void outputPegawai(){
        std::cout<<"NIP : "<<this->nip<<"\n";
        std::cout<<"Nama : "<<this->nama<<"\n";
        std::cout<<"Golongan gaji : "<<this->nip<<"\n";

        std::cout<<"Waktu Datang : "<<this->datang.getWaktu();
```



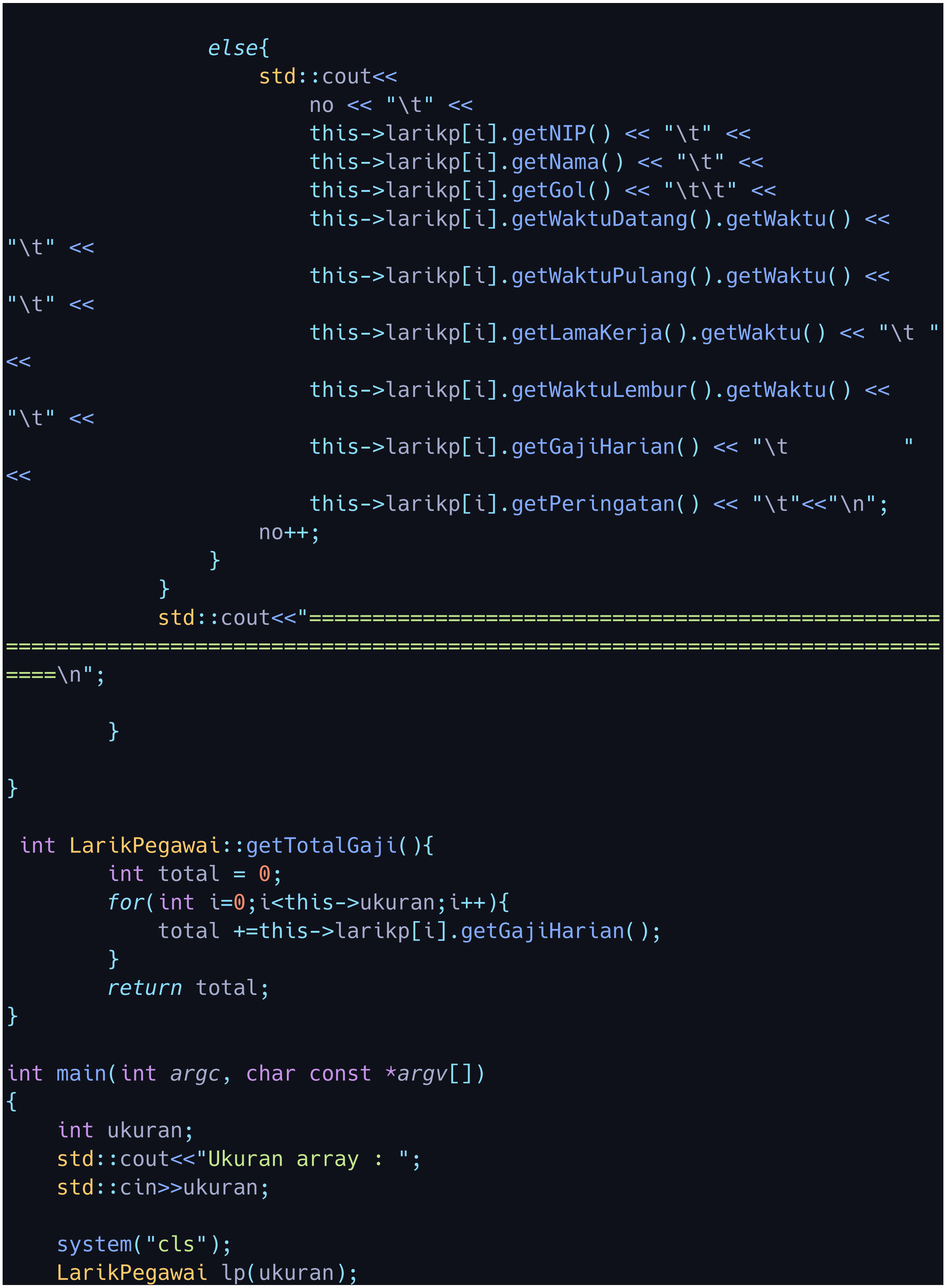
```
        std::cout<<"Waktu Pulang : "<<this->pulang.getWaktu();
    }

    Waktu getLamaKerja(){
        return this->datang.cariDurasi(this->pulang);
    }

    Waktu getWaktuLembur(){
        Waktu delJam(8,0,0);
        Waktu hasil(0,0,0);

        if(getLamaKerja().getJam() >= 8){
            hasil=delJam.cariDurasi(getLamaKerja());
        }
        return hasil;
    }
    int getTambahanLembur(){
        int tambahan = 0;

        if(this->gol==1){
            tambahan = (50000*getWaktuLembur().getJam());
        }

        else if(this->gol==2){
            tambahan = (70000*getWaktuLembur().getJam());
        }

        else if(this->gol==3){
            tambahan = (150000*getWaktuLembur().getJam());
        }
        else if(this->gol==4){
            tambahan = (200000*getWaktuLembur().getJam());
        }


        return tambahan;
    }

     int getGajiPokok(){
        int gapok = 0;

        if(this->gol == 1){
            gapok = 150000;

        }
```



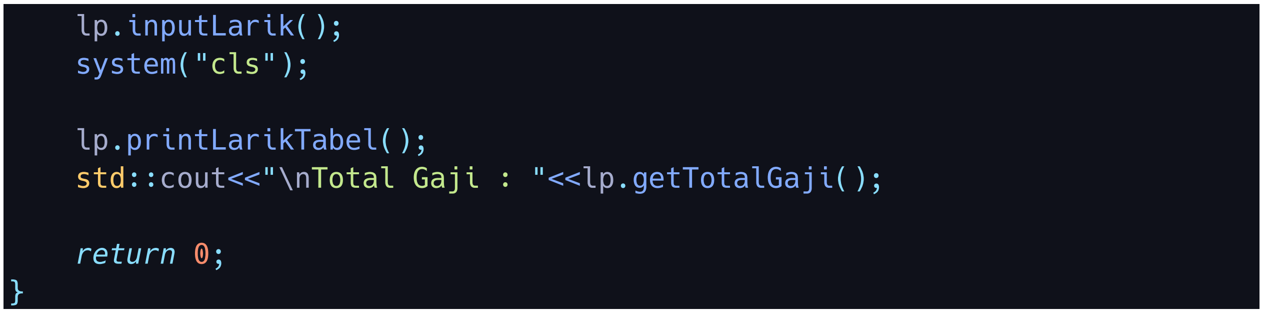
```
        else if(this->gol == 2){
            gapok = 200000;
        }

        else if(this->gol == 3){
            gapok = 400000;
        }
        else if(this->gol == 4){
            gapok = 500000;
        }


        return gapok;
    }

    int getGajiHarian(){
        int tambahan = getTambahanLembur();
        int gapok = getGajiPokok();
        int gajiHarian = tambahan + gapok;

        return gajiHarian;
    }

    std::string getPeringatan(){
        std::string hasil = "";
        if(getLamaKerja().getJam()<8){
            hasil = "SP1";
        }

        return hasil;
    }
};

class LarikPegawai{
    private:
        int ukuran;
        Pegawai larikp[1000];

    public:
        LarikPegawai(int ukuran);
        void setUkuran(int ukuran);
        void inputLarik();
        void printLarikTabel();
        int getUkuran();
```



```
        int getTotalGaji();
};

LarikPegawai::LarikPegawai(int ukuran){
    this->ukuran = ukuran;
}

void LarikPegawai::setUkuran(int ukuran){
    this->ukuran = ukuran;
}

void LarikPegawai::inputLarik(){
    for(int i=0;i<this->ukuran;i++){
        std::cout<<"Pegawai ke - " << i+1<<"\n\n";
        larikp[i].inputPegawai();
        system("cls");
    }
}

int LarikPegawai::getUkuran(){
    return this->ukuran;
}

void LarikPegawai::printLarikTabel(){
     int no = 1;
        std::cout<<"\t\t\t\t==== Daftar Gaji Harian PT Informatika
====\n";
        if(this->larikp[0].getNIP()==" "){
            std::cout<<"Data kosong ! \n";
        }


        else{
            std::cout<<"==================================================
==========================================================================
====\n";
            std::cout<<"No\tNIP\tNama\tGolongan\tDatang\t\tPulang\t\tLama\
t\tJamLembur\tGajiHarian\tStatus\n";
            std::cout<<"==================================================
==========================================================================
====\n";
            for(int i=0;i<this->ukuran;i++){
                if(this->larikp[i].getNIP() == " "){
                    break;
                }
```

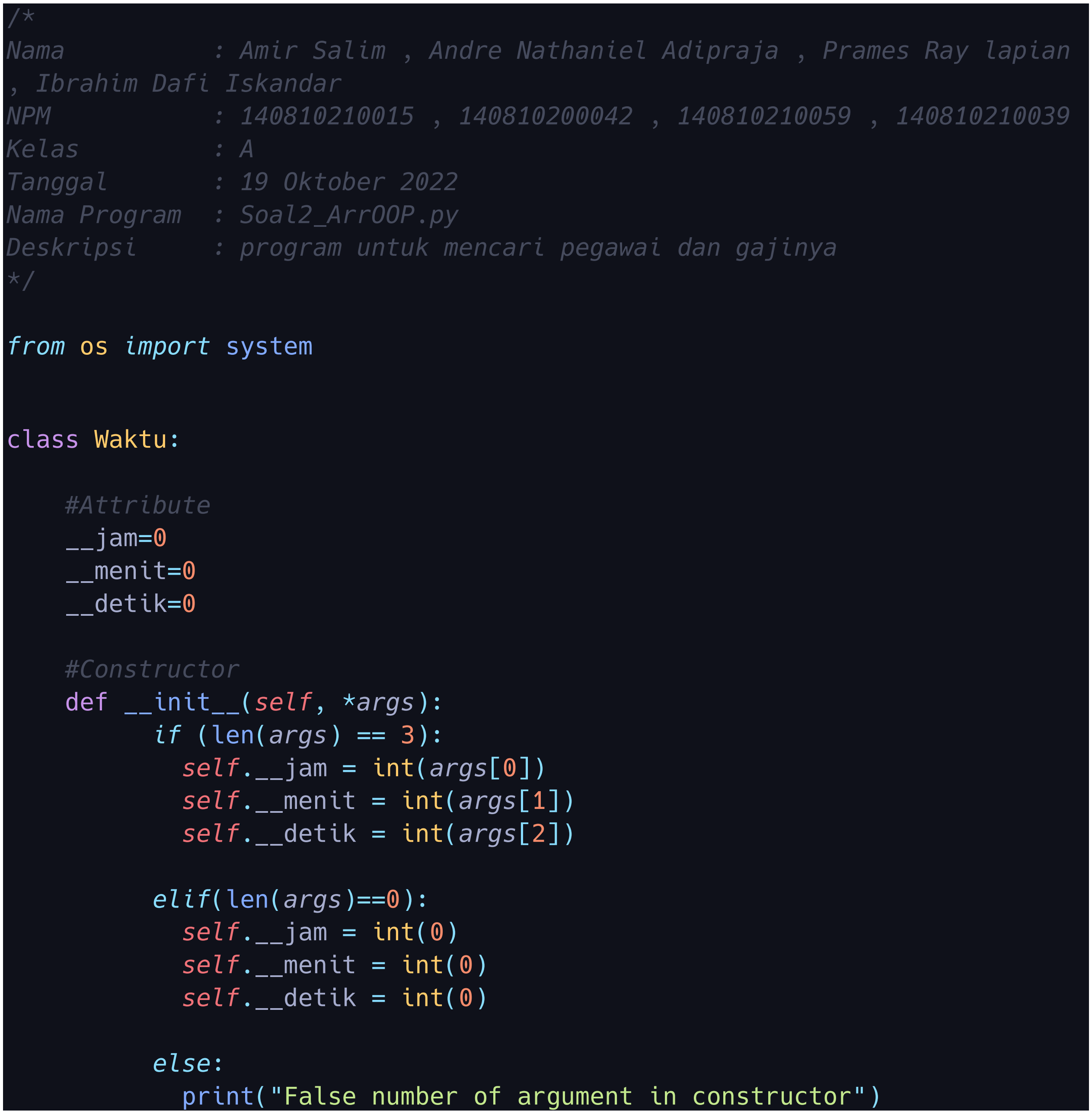


```
                else{
                    std::cout<<
                        no << "\t" <<
                        this->larikp[i].getNIP() << "\t" <<
                        this->larikp[i].getNama() << "\t" <<
                        this->larikp[i].getGol() << "\t\t" <<
                        this->larikp[i].getWaktuDatang().getWaktu() <<
"\t" <<
                        this->larikp[i].getWaktuPulang().getWaktu() <<
"\t" <<
                        this->larikp[i].getLamaKerja().getWaktu() << "\t "
<<
                        this->larikp[i].getWaktuLembur().getWaktu() <<
"\t" <<
                        this->larikp[i].getGajiHarian() << "\t         "
<<
                        this->larikp[i].getPeringatan() << "\t"<<"\n";
                    no++;
                }
            }
            std::cout<<"==================================================
==========================================================================
====\n";

        }

}

 int LarikPegawai::getTotalGaji(){
        int total = 0;
        for(int i=0;i<this->ukuran;i++){
            total +=this->larikp[i].getGajiHarian();
        }
        return total;
}

int main(int argc, char const *argv[])
{
    int ukuran;
    std::cout<<"Ukuran array : ";
    std::cin>>ukuran;

    system("cls");
    LarikPegawai lp(ukuran);
```

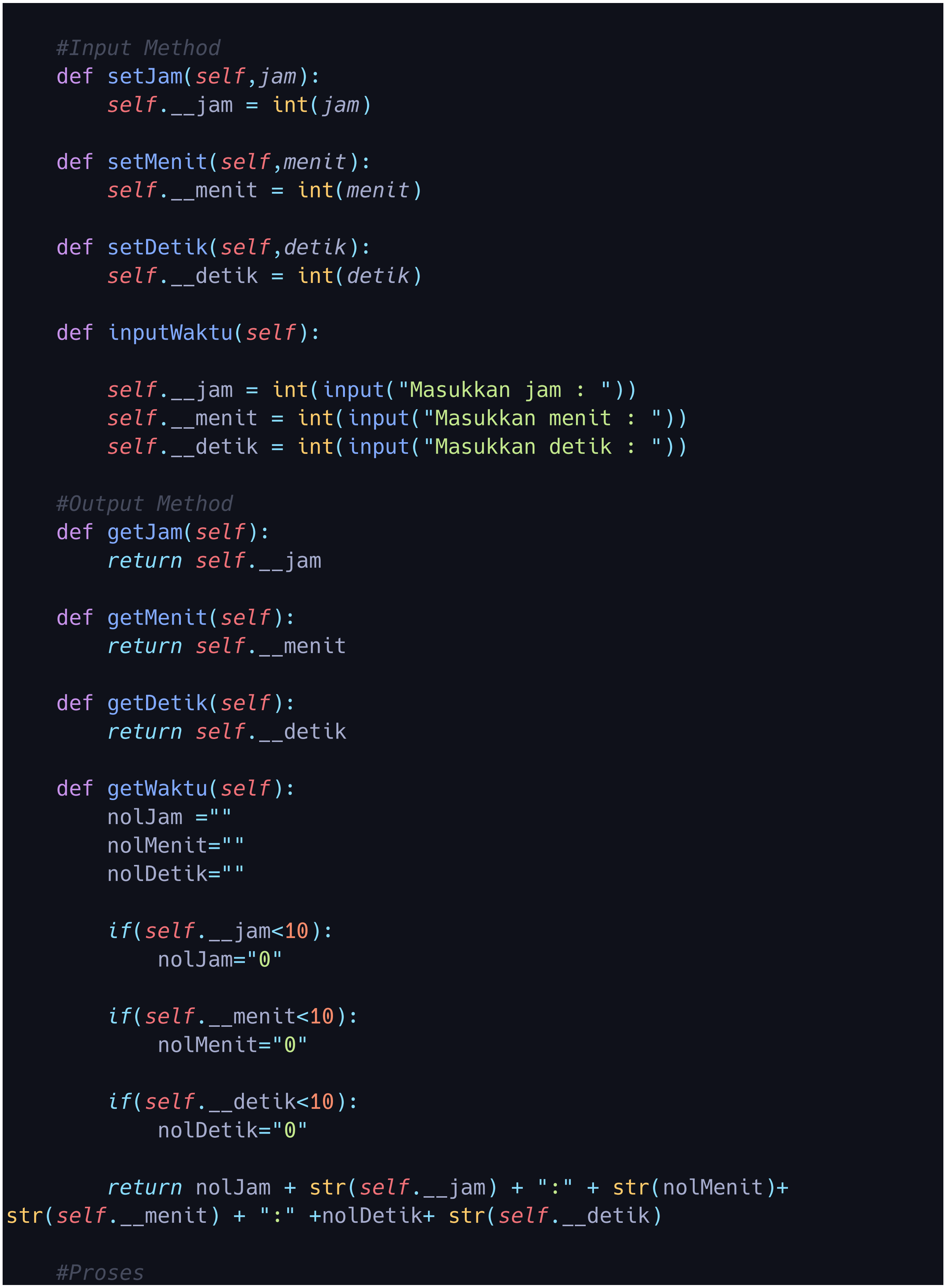


```
    lp.inputLarik();
    system("cls");

    lp.printLarikTabel();
    std::cout<<"\nTotal Gaji : "<<lp.getTotalGaji();

    return 0;
}
```

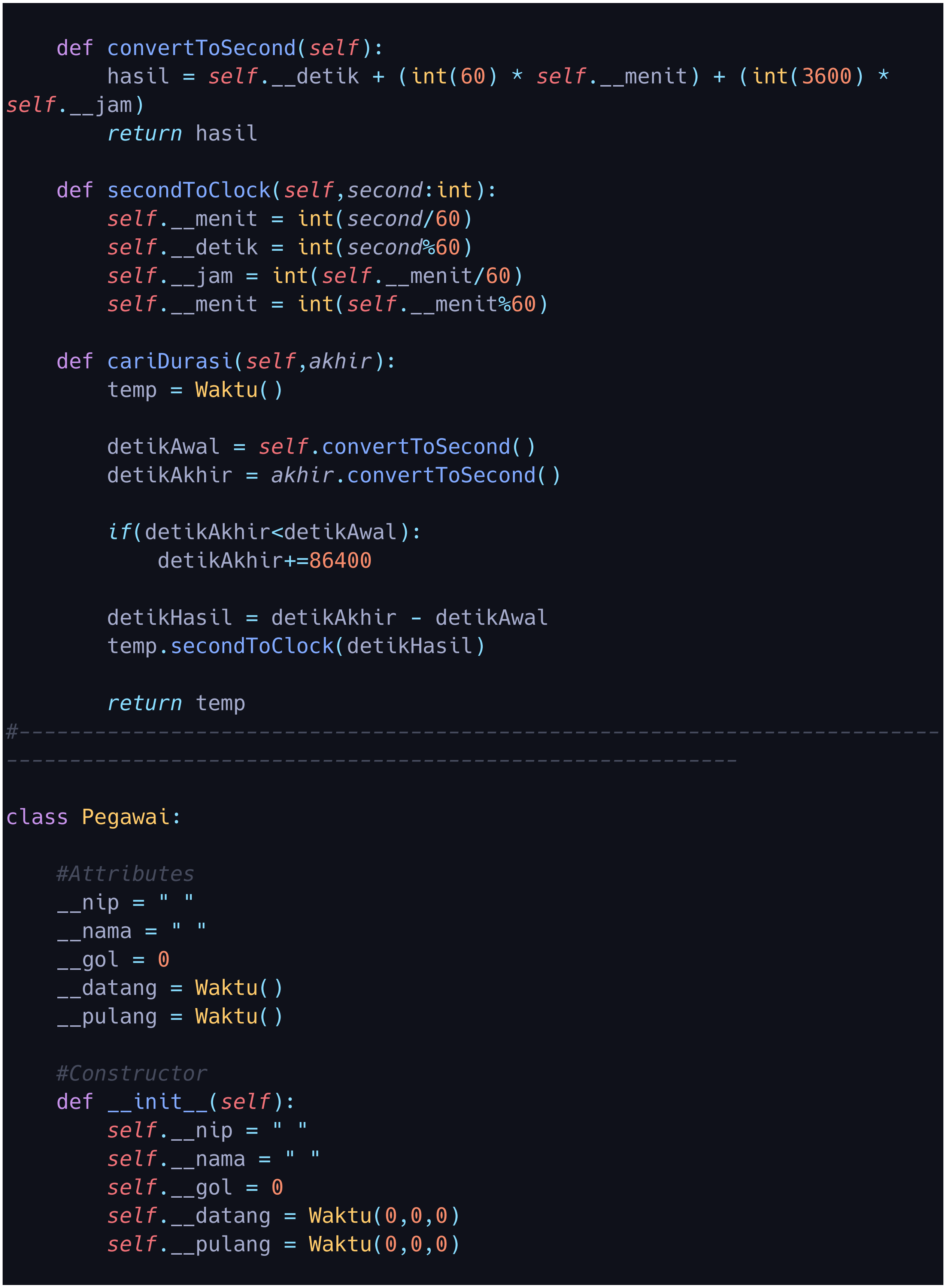
ii. Python



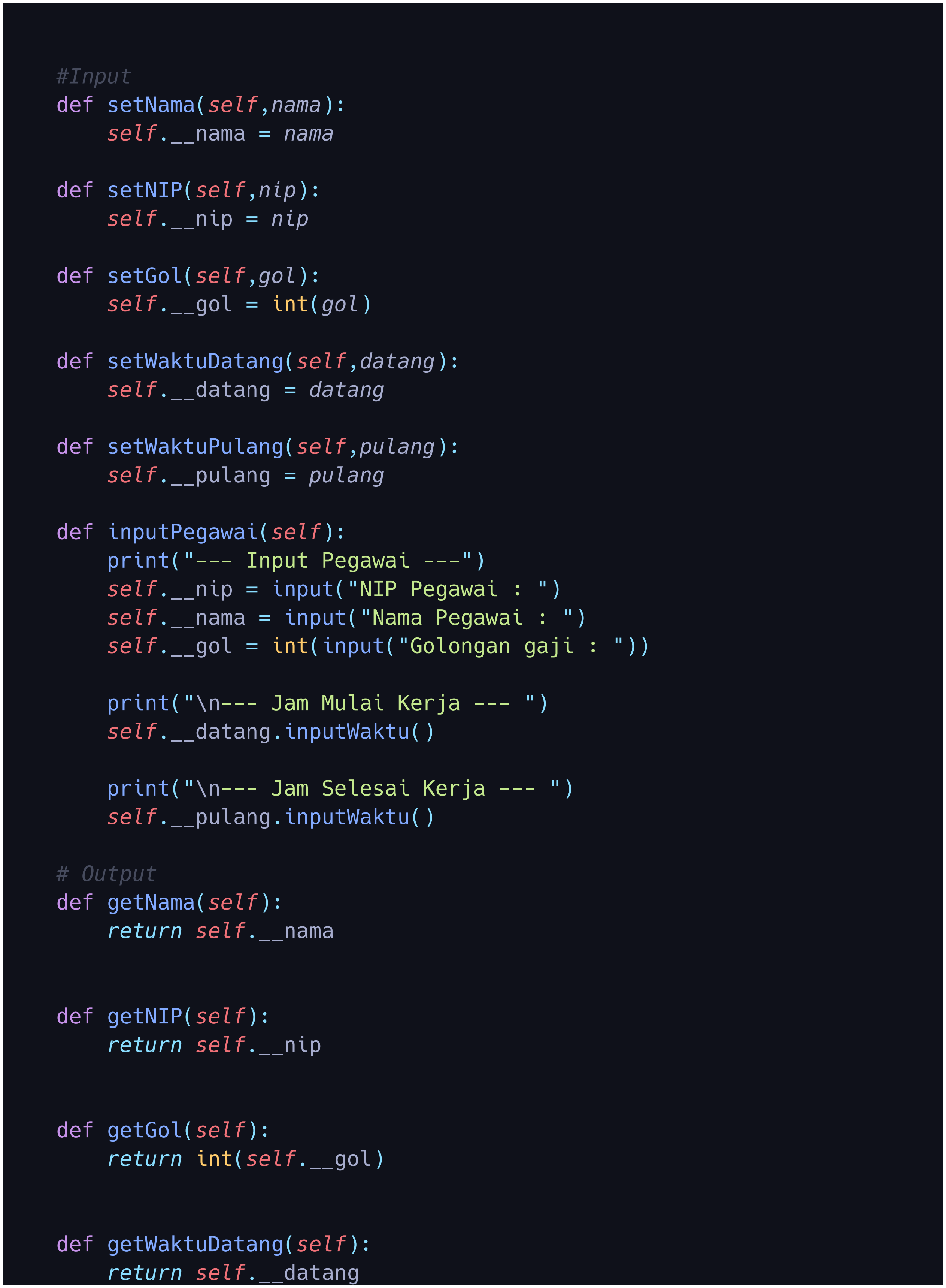
```
/*
Nama          : Amir Salim , Andre Nathaniel Adipraja , Prames Ray lapian
, Ibrahim Dafi Iskandar
NPM           : 140810210015 , 140810200042 , 140810210059 , 140810210039
Kelas         : A
Tanggal       : 19 Oktober 2022
Nama Program  : Soal2_ArrOOP.py
Deskripsi     : program untuk mencari pegawai dan gajinya
*/

from os import system


class Waktu:

    #Attribute
    __jam=0
    __menit=0
    __detik=0

    #Constructor
    def __init__(self, *args):
          if (len(args) == 3):
            self.__jam = int(args[0])
            self.__menit = int(args[1])
            self.__detik = int(args[2])

          elif(len(args)==0):
            self.__jam = int(0)
            self.__menit = int(0)
            self.__detik = int(0)

          else:
            print("False number of argument in constructor")
```



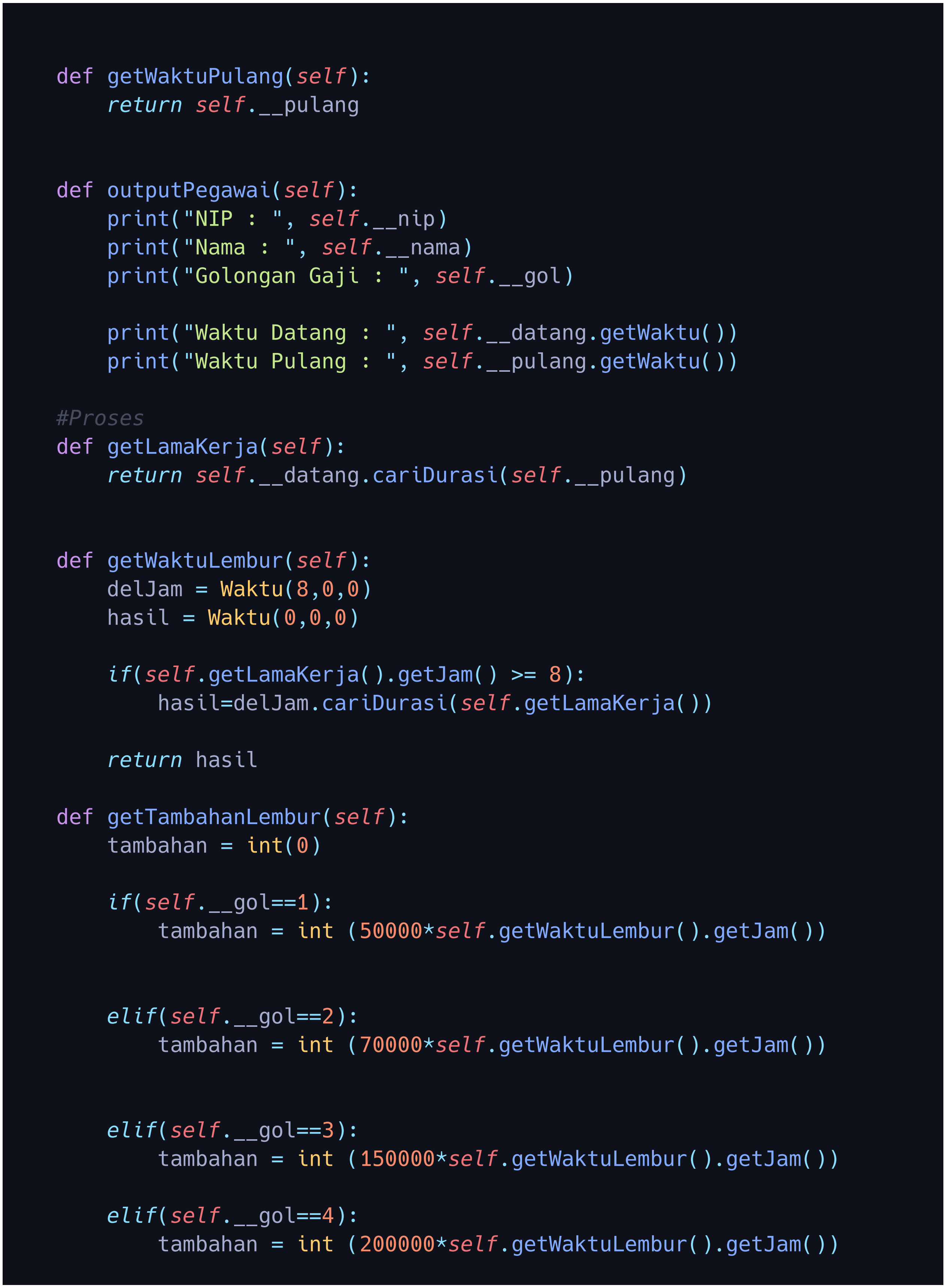
```
    #Input Method
    def setJam(self,jam):
        self.__jam = int(jam)

    def setMenit(self,menit):
        self.__menit = int(menit)

    def setDetik(self,detik):
        self.__detik = int(detik)

    def inputWaktu(self):

        self.__jam = int(input("Masukkan jam : "))
        self.__menit = int(input("Masukkan menit : "))
        self.__detik = int(input("Masukkan detik : "))

    #Output Method
    def getJam(self):
        return self.__jam

    def getMenit(self):
        return self.__menit

    def getDetik(self):
        return self.__detik

    def getWaktu(self):
        nolJam =""
        nolMenit=""
        nolDetik=""

        if(self.__jam<10):
            nolJam="0"

        if(self.__menit<10):
            nolMenit="0"

        if(self.__detik<10):
            nolDetik="0"

        return nolJam + str(self.__jam) + ":" + str(nolMenit)+
str(self.__menit) + ":" +nolDetik+ str(self.__detik)

    #Proses
```



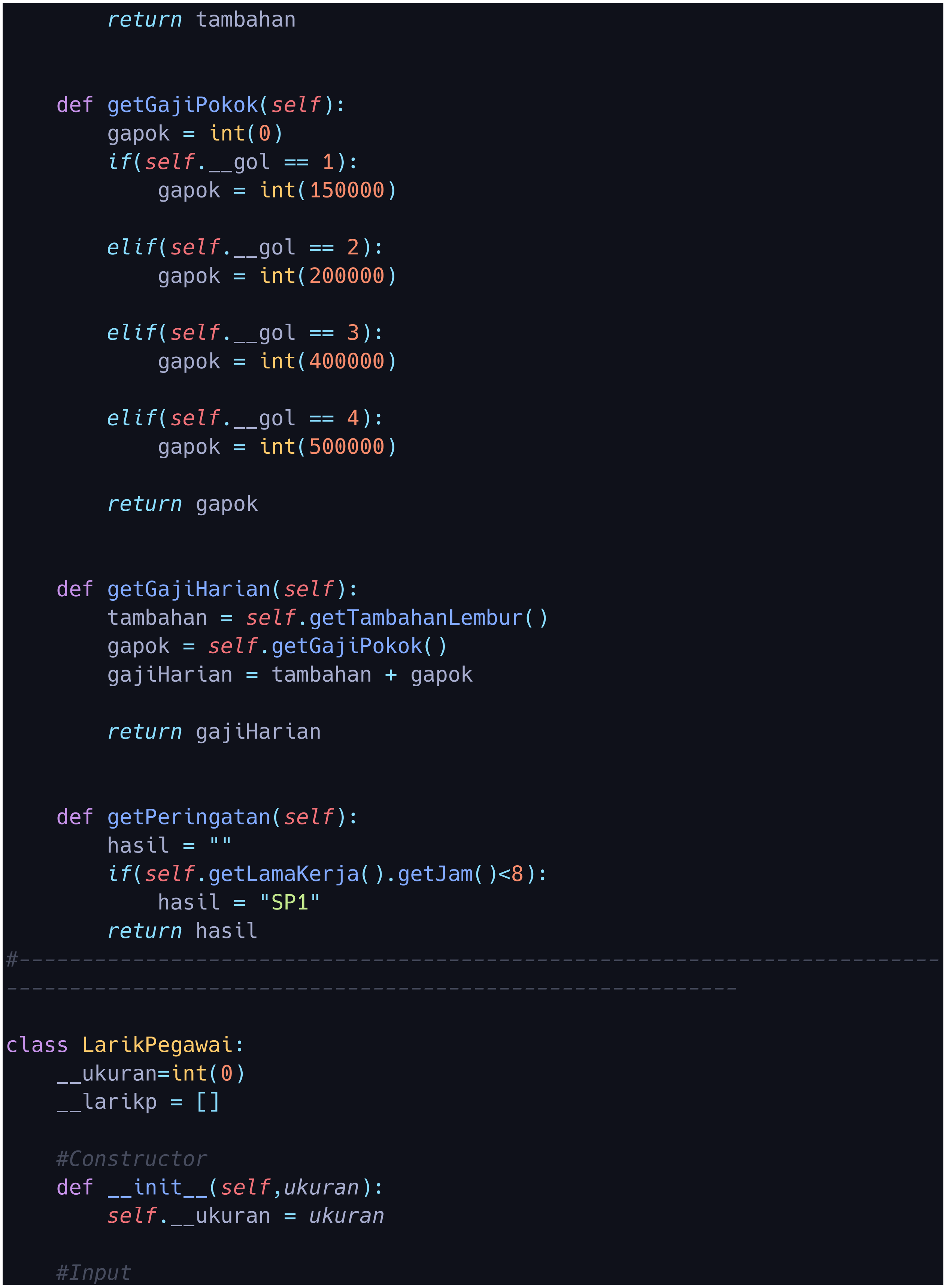
```
    def convertToSecond(self):
        hasil = self.__detik + (int(60) * self.__menit) + (int(3600) *
self.__jam)
        return hasil

    def secondToClock(self,second:int):
        self.__menit = int(second/60)
        self.__detik = int(second%60)
        self.__jam = int(self.__menit/60)
        self.__menit = int(self.__menit%60)

    def cariDurasi(self,akhir):
        temp = Waktu()

        detikAwal = self.convertToSecond()
        detikAkhir = akhir.convertToSecond()

        if(detikAkhir<detikAwal):
            detikAkhir+=86400

        detikHasil = detikAkhir - detikAwal
        temp.secondToClock(detikHasil)

        return temp
#-------------------------------------------------------------------------
----------------------------------------------------------

class Pegawai:

    #Attributes
    __nip = " "
    __nama = " "
    __gol = 0
    __datang = Waktu()
    __pulang = Waktu()

    #Constructor
    def __init__(self):
        self.__nip = " "
        self.__nama = " "
        self.__gol = 0
        self.__datang = Waktu(0,0,0)
        self.__pulang = Waktu(0,0,0)
```



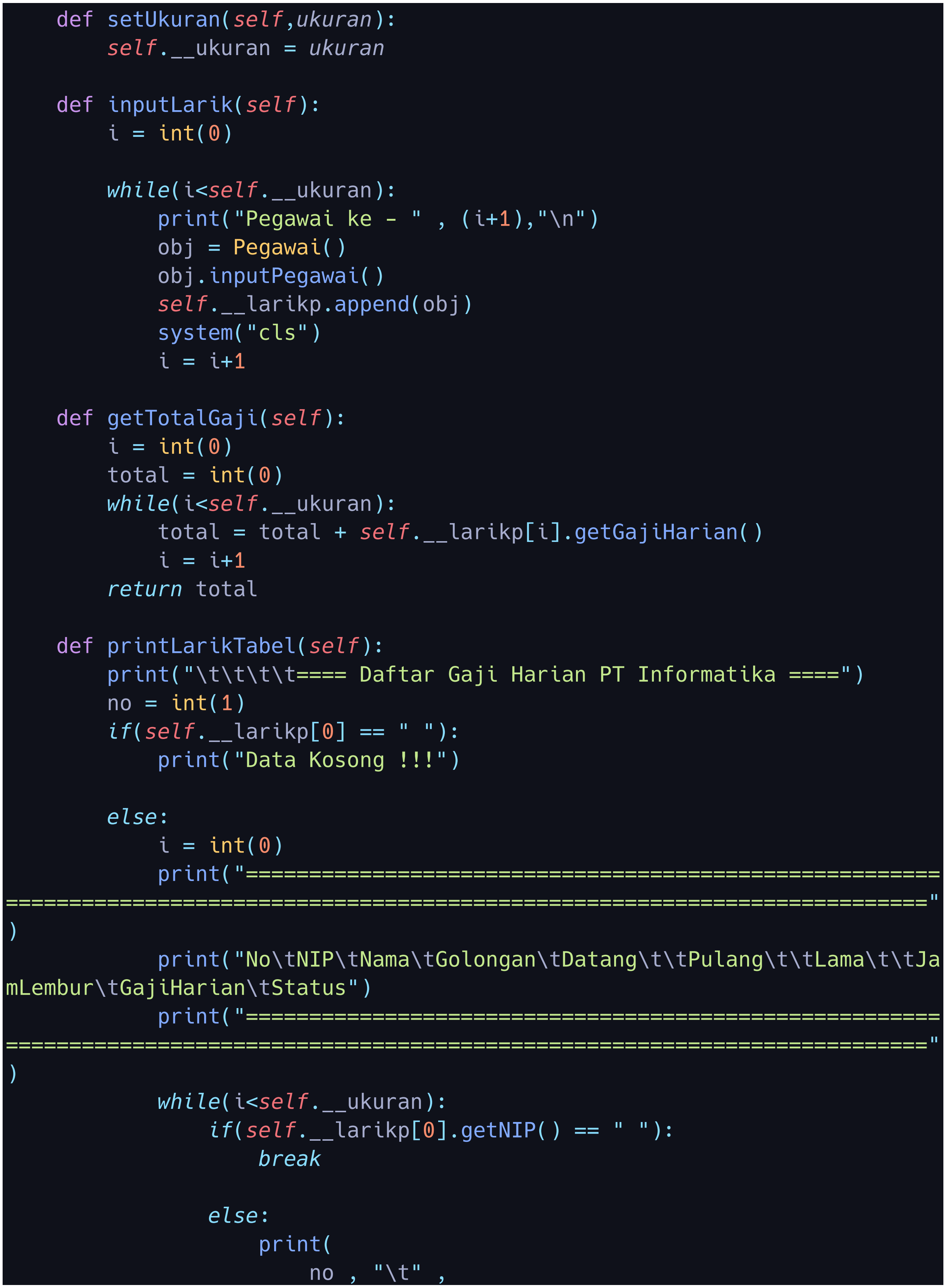
```
#Input
def setNama(self,nama):
    self.__nama = nama

def setNIP(self,nip):
    self.__nip = nip

def setGol(self,gol):
    self.__gol = int(gol)

def setWaktuDatang(self,datang):
    self.__datang = datang

def setWaktuPulang(self,pulang):
    self.__pulang = pulang

def inputPegawai(self):
    print("--- Input Pegawai ---")
    self.__nip = input("NIP Pegawai : ")
    self.__nama = input("Nama Pegawai : ")
    self.__gol = int(input("Golongan gaji : "))

    print("\n--- Jam Mulai Kerja --- ")
    self.__datang.inputWaktu()

    print("\n--- Jam Selesai Kerja --- ")
    self.__pulang.inputWaktu()

# Output
def getNama(self):
    return self.__nama


def getNIP(self):
    return self.__nip


def getGol(self):
    return int(self.__gol)


def getWaktuDatang(self):
    return self.__datang
```



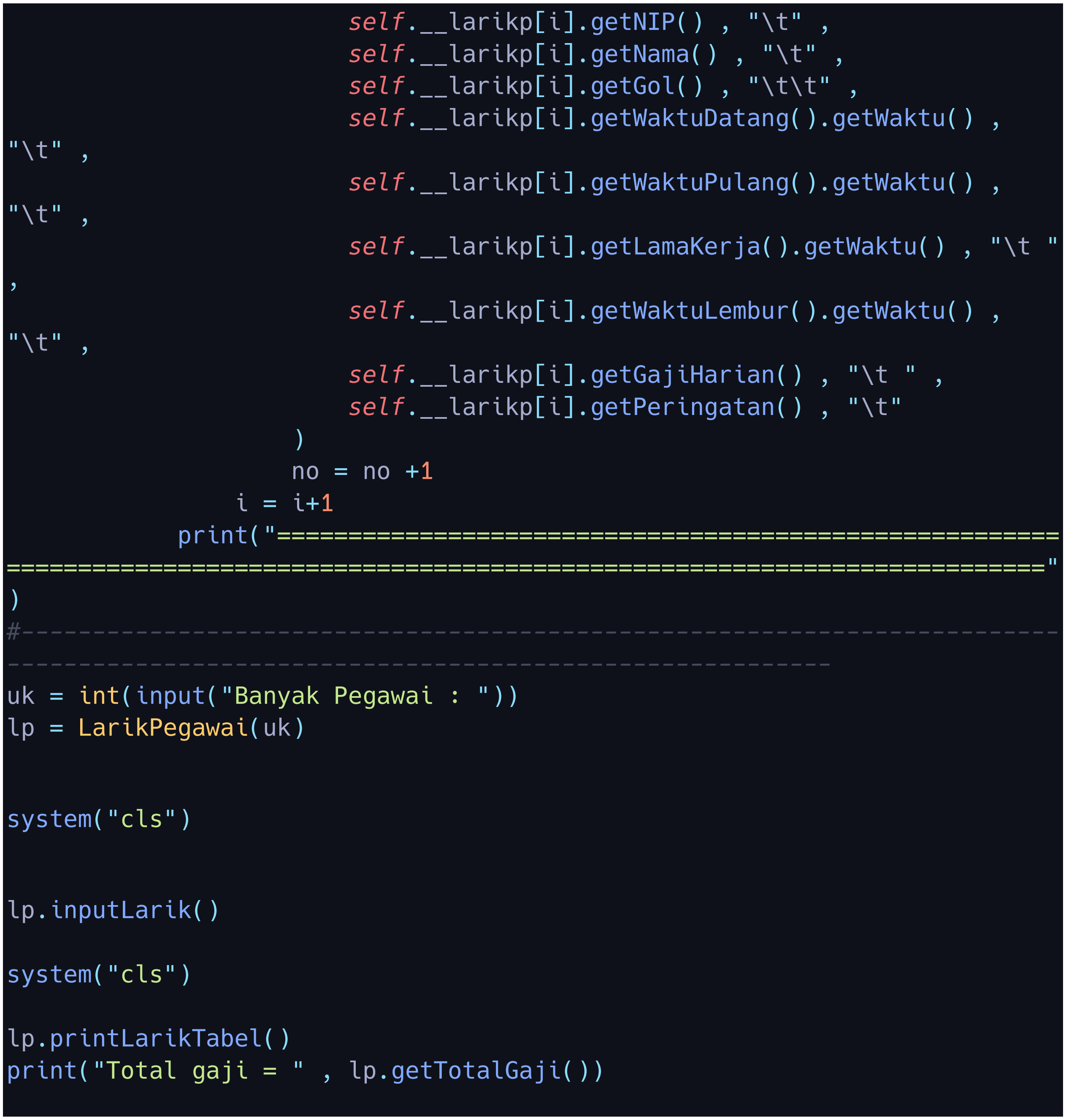
```
def getWaktuPulang(self):
    return self.__pulang


def outputPegawai(self):
    print("NIP : ", self.__nip)
    print("Nama : ", self.__nama)
    print("Golongan Gaji : ", self.__gol)

    print("Waktu Datang : ", self.__datang.getWaktu())
    print("Waktu Pulang : ", self.__pulang.getWaktu())

#Proses
def getLamaKerja(self):
    return self.__datang.cariDurasi(self.__pulang)


def getWaktuLembur(self):
    delJam = Waktu(8,0,0)
    hasil = Waktu(0,0,0)

    if(self.getLamaKerja().getJam() >= 8):
        hasil=delJam.cariDurasi(self.getLamaKerja())

    return hasil

def getTambahanLembur(self):
    tambahan = int(0)

    if(self.__gol==1):
        tambahan = int (50000*self.getWaktuLembur().getJam())


    elif(self.__gol==2):
        tambahan = int (70000*self.getWaktuLembur().getJam())


    elif(self.__gol==3):
        tambahan = int (150000*self.getWaktuLembur().getJam())

    elif(self.__gol==4):
        tambahan = int (200000*self.getWaktuLembur().getJam())
```



```python
        return tambahan


    def getGajiPokok(self):
        gapok = int(0)
        if(self.__gol == 1):
            gapok = int(150000)

        elif(self.__gol == 2):
            gapok = int(200000)

        elif(self.__gol == 3):
            gapok = int(400000)

        elif(self.__gol == 4):
            gapok = int(500000)

        return gapok


    def getGajiHarian(self):
        tambahan = self.getTambahanLembur()
        gapok = self.getGajiPokok()
        gajiHarian = tambahan + gapok

        return gajiHarian


    def getPeringatan(self):
        hasil = ""
        if(self.getLamaKerja().getJam()<8):
            hasil = "SP1"
        return hasil
#------------------------------------------------------------------------------------------------------------------------------------

class LarikPegawai:
    __ukuran=int(0)
    __larikp = []

    #Constructor
    def __init__(self,ukuran):
        self.__ukuran = ukuran

    #Input
```

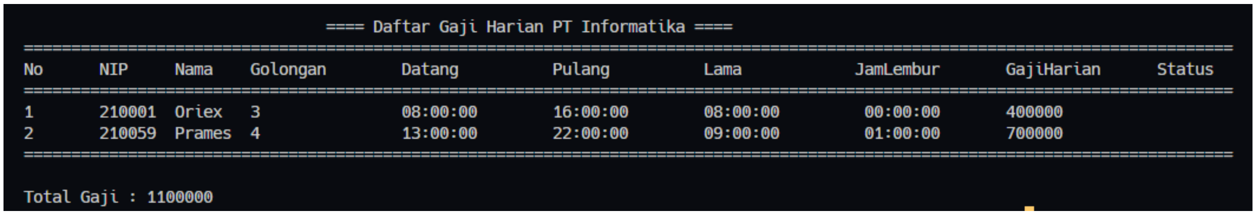


```
    def setUkuran(self,ukuran):
        self.__ukuran = ukuran

    def inputLarik(self):
        i = int(0)

        while(i<self.__ukuran):
            print("Pegawai ke - " , (i+1),"\n")
            obj = Pegawai()
            obj.inputPegawai()
            self.__larikp.append(obj)
            system("cls")
            i = i+1

    def getTotalGaji(self):
        i = int(0)
        total = int(0)
        while(i<self.__ukuran):
            total = total + self.__larikp[i].getGajiHarian()
            i = i+1
        return total

    def printLarikTabel(self):
        print("\t\t\t\t==== Daftar Gaji Harian PT Informatika ====")
        no = int(1)
        if(self.__larikp[0] == " "):
            print("Data Kosong !!!")

        else:
            i = int(0)
            print("=======================================================
========================================================================="
)
            print("No\tNIP\tNama\tGolongan\tDatang\t\tPulang\t\tLama\t\tJa
mLembur\tGajiHarian\tStatus")
            print("=======================================================
========================================================================="
)
            while(i<self.__ukuran):
                if(self.__larikp[0].getNIP() == " "):
                    break

                else:
                    print(
                        no , "\t" ,
```



```
                        self.__larikp[i].getNIP() , "\t" ,
                        self.__larikp[i].getNama() , "\t" ,
                        self.__larikp[i].getGol() , "\t\t" ,
                        self.__larikp[i].getWaktuDatang().getWaktu() ,
"\t" ,
                        self.__larikp[i].getWaktuPulang().getWaktu() ,
"\t" ,
                        self.__larikp[i].getLamaKerja().getWaktu() , "\t "
,
                        self.__larikp[i].getWaktuLembur().getWaktu() ,
"\t" ,
                        self.__larikp[i].getGajiHarian() , "\t " ,
                        self.__larikp[i].getPeringatan() , "\t"
                    )
                    no = no +1
                i = i+1
            print("=======================================================
=========================================================================="
)
#-------------------------------------------------------------------------
----------------------------------------------------------
uk = int(input("Banyak Pegawai : "))
lp = LarikPegawai(uk)


system("cls")


lp.inputLarik()

system("cls")

lp.printLarikTabel()
print("Total gaji = " , lp.getTotalGaji())
```

b. Screenshot:



```
                                    ==== Daftar Gaji Harian PT Informatika ====
================================================================================================================================================
No       NIP      Nama     Golongan          Datang            Pulang            Lama              JamLembur         GajiHarian        Status
================================================================================================================================================
1        210001   Oriex    3                 08:00:00          16:00:00          08:00:00           00:00:00         400000
2        210059   Prames   4                 13:00:00          22:00:00          09:00:00           01:00:00         700000
================================================================================================================================================

Total Gaji : 1100000
```