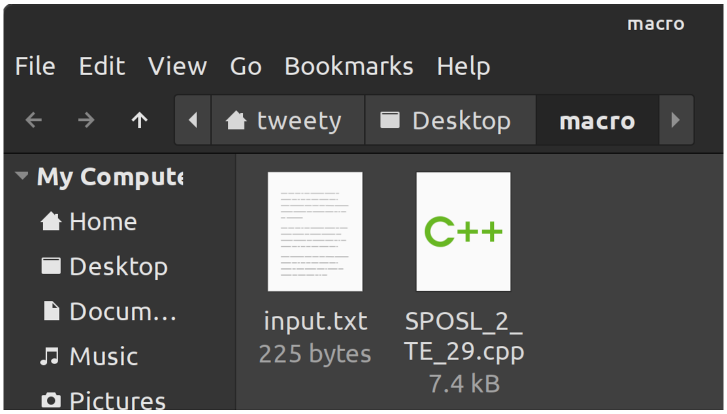
SPOSL Ass.2 : TE_29_Samruddhi Khairnar 05/10

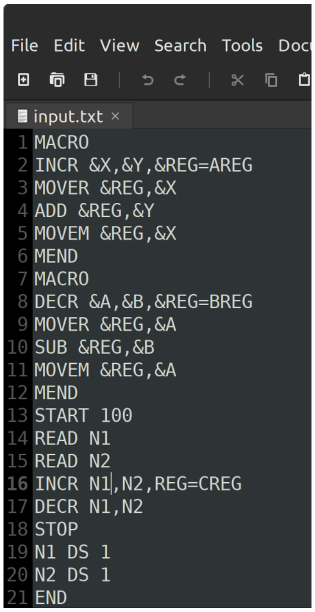
Two-pass Macro-Preprocessor

Output :

Initial:

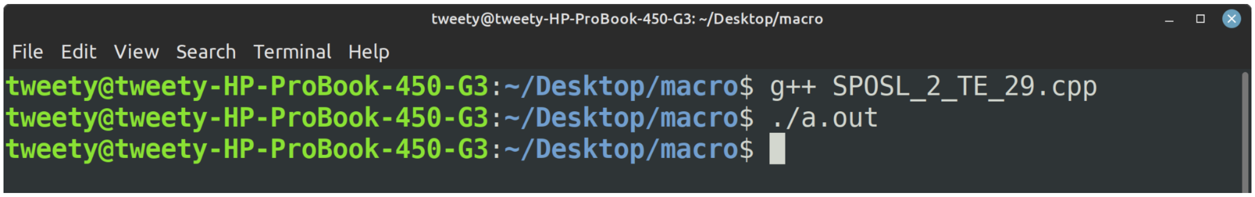


Input:



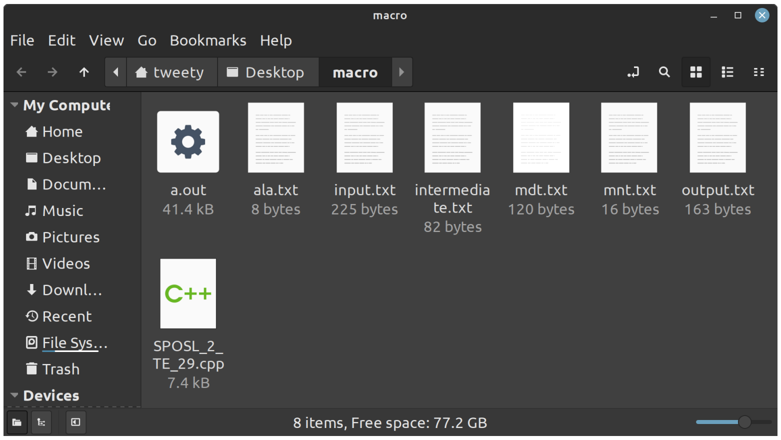
```
MACRO
INCR &X,&Y,&REG=AREG
MOVER &REG,&X
ADD &REG,&Y
MOVEM &REG,&X
MEND
MACRO
DECR &A,&B,&REG=BREG
MOVER &REG,&A
SUB &REG,&B
MOVEM &REG,&A
MEND
START 100
READ N1
READ N2
INCR N1,N2,REG=CREG
DECR N1,N2
STOP
N1 DS 1
N2 DS 1
END
```

Compilation:

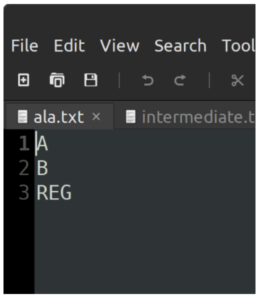

tweety@tweety-HP-ProBook-450-G3: ~/Desktop/macro
File Edit View Search Terminal Help

```
tweety@tweety-HP-ProBook-450-G3:~/Desktop/macro$ g++ SPOSL_2_TE_29.cpp
tweety@tweety-HP-ProBook-450-G3:~/Desktop/macro$ ./a.out
tweety@tweety-HP-ProBook-450-G3:~/Desktop/macro$
```

After Running Code:

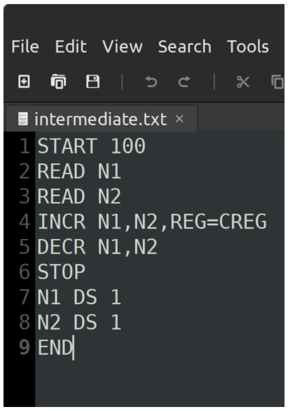


ALA:



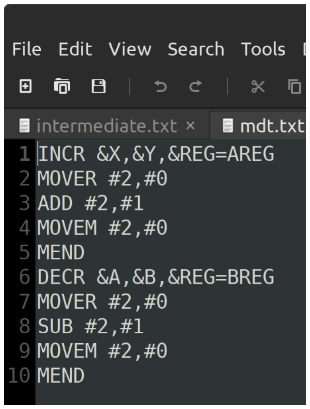
```
A
B
REG
```

Intermediate Code:



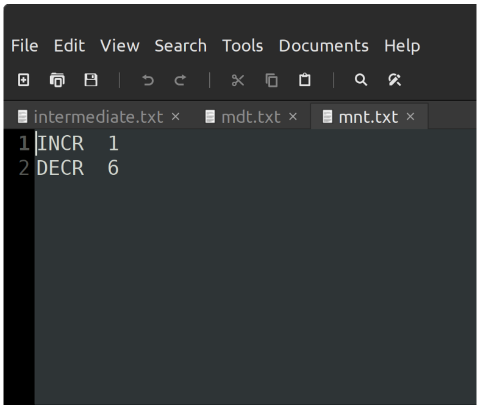
```
START 100
READ N1
READ N2
INCR N1,N2,REG=CREG
DECR N1,N2
STOP
N1 DS 1
N2 DS 1
END
```

MDT:



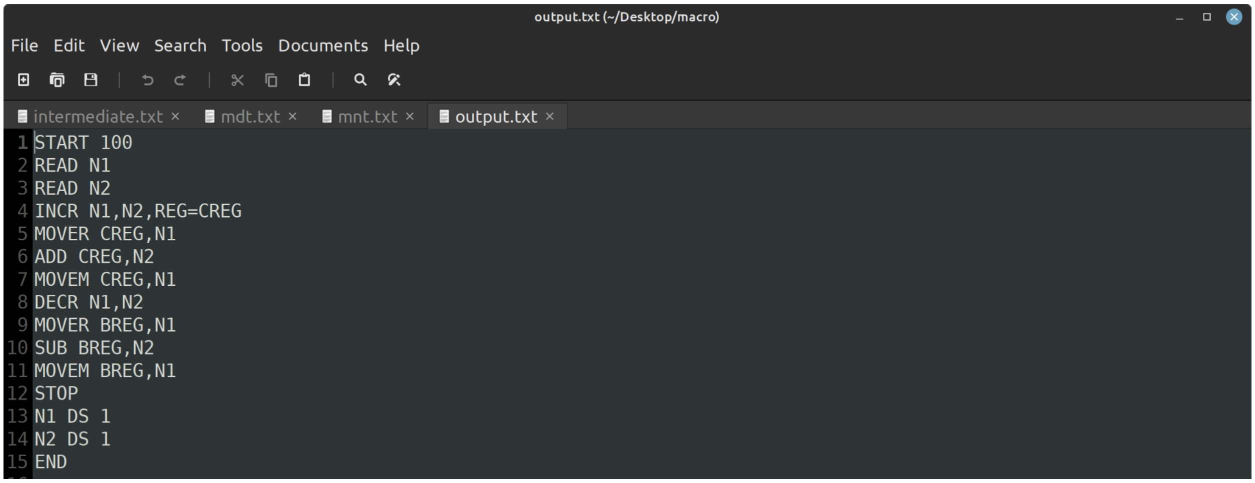
```
INCR &X,&Y,&REG=AREG
MOVER #2,#0
ADD #2,#1
MOVEM #2,#0
MEND
DECR &A,&B,&REG=BREG
MOVER #2,#0
SUB #2,#1
MOVEM #2,#0
MEND
```

MNT:



```
INCR   1
DECR   6
```

Final Output:


output.txt (~/Desktop/macro)
File Edit View Search Tools Documents Help
intermediate.txt ×
mdt.txt ×
mnt.txt ×
output.txt ×

```
START 100
READ N1
READ N2
INCR N1,N2,REG=CREG
MOVER CREG,N1
ADD CREG,N2
MOVEM CREG,N1
DECR N1,N2
MOVER BREG,N1
SUB BREG,N2
MOVEM BREG,N1
STOP
N1 DS 1
N2 DS 1
END
```

Code :

```cpp
//Macro-Preprocessor in Cpp - TE_29_Samruddhi Khairnar
#include <iostream>
#include <fstream>
using namespace std;
class Pass1
{
        private:
                ifstream infile;
                ofstream outfile;
                string buffer="";
                int flag=0;
                int macro_start=0;
        public:
                void run()
                {
                        outfile.open("mnt.txt",ios::out);
                        outfile<<"";
                        outfile.close();
                        outfile.open("mdt.txt",ios::out);
```

```
outfile<<"";
outfile.close();

infile.open("input.txt");
while(!infile.eof())
{
        int mdtc=0,mntc=0;
        ifstream fin;
        fin.open("mdt.txt");
        if(fin.is_open())
        {
                while(!fin.eof())
                {
                        string temp;
                        getline(fin,temp);
                        if(temp!="")
                                mdtc++;
                }
        }
        fin.close();
        fin.open("mnt.txt");
        if(fin.is_open())
        {
                while(!fin.eof())
                {
                        string temp;
                        getline(fin,temp);
                        if(temp!="")
                                mntc++;
                }
        }
        fin.close();
        string line;
        getline(infile,line);

        int i=0,parts=0,var=0,pc=0,vc=-1;
        while(i<line.length())
        {
                if(line[i]==' ')
                        parts++;
                else if(line[i]=='&')
                        var++;
                i++;
        }
        string *arr = new string[parts+1];
        string *ala = new string[var];
        i=0;
        while(i<line.length())
        {
                arr[pc]+=line[i];
                if(line[i]==' ')
                        pc++;
                else if(line[i]=='&')
                        vc++;
```

```
                                        else if(vc>-1 && !(line[i]==' '||line[i]==','))
                                                ala[vc]+=line[i];
                                        i++;
                                }
                                string temp;
                                for(i=0;i<var;i++)
                                {
                                        temp="";
                                        for(int j=0;j<ala[i].length();j++)
                                        {
                                                if(ala[i][j]=='=')
                                                        break;
                                                temp+=ala[i][j];
                                        }
                                        ala[i]=temp;
                                }

                                temp="";
                                for(i=0;i<var;i++)
                                        temp+=ala[i]+"\n";
                                if(macro_start==1)
                                {
                                        outfile.open("ala.txt",ios::out);
                                        outfile<<temp;
                                        outfile.close();
                                }

                                if(macro_start>1)
                                {
                                        var=0;
                                        ifstream fin;
                                        fin.open("ala.txt");
                                        if(fin.is_open())
                                        {
                                                while(!fin.eof())
                                                {
                                                        string temp;
                                                        getline(fin,temp);
                                                        if(temp!="")
                                                                var++;
                                                }
                                        }
                                        fin.close();
                                        string *args = new string[var];
                                        var=0;
                                        fin.open("ala.txt");
                                        if(fin.is_open())
                                        {
                                                while(!fin.eof())
                                                {
                                                        string temp;
                                                        getline(fin,temp);
                                                        if(temp!="")
                                                        {
```

```
								args[var]=temp;
								var++;
							}
						}
					}
					fin.close();
					int num=var;
					var=0;temp="";
					string varia="";

					for(i=0;i<line.length();i++)
					{
						if(line[i]=='&')
						{
							var=1;
							varia="";
						}
						if(var==1)
						{
							if (line[i]==' 
'||line[i]==','||line[i]=='=')
								var=0;
							else if(line[i]!='&')
								varia+=line[i];
							if (line[i]==' 
'||line[i]==','||line[i]=='='||i==line.length()-1)
							{
								if(i==line.length()-1)
									flag=1;
								for(int j=0;j<num;j++)
								{
									if(args[j]==varia)

temp+="#"+to_string(j);
								}
							}
						}
						if(var==0 || (i==line.length()-1 && flag==0) && 
temp!="")
							temp += line[i];
					}
					outfile.open("mdt.txt",ios::app);
					outfile<<temp<<"\n";
					outfile.close();
				}
				if(macro_start == 1 && arr[0]!="MACRO" && arr[0]!="MEND")
				{
					macro_start ++;
					outfile.open("mnt.txt",ios::app);
					outfile<<arr[0]<<" "<<mdtc+1<<"\n";
					outfile.close();

					outfile.open("mdt.txt",ios::app);
					outfile<<line<<"\n";
```

```
                                        outfile.close();
                                }

                                //Find Macro
                                if(arr[0]=="MACRO")
                                        macro_start = 1;
                                else if(arr[0]=="MEND")
                                        macro_start = 0;
                                else if(macro_start==0)
                                        buffer += line + "\n";
                        }
                        outfile.open("intermediate.txt",ios::out);
                        outfile<<buffer;
                        outfile.close();
                }
};

class Pass2
{
        private:
                ifstream infile;
                ofstream outfile;
                int flag=0;
        public:
                void run()
                {
                        string buffer="";
                        int mntc=0,mdtc=0;
                        ifstream fin;
                        fin.open("mnt.txt");
                        if(fin.is_open())
                        {
                                while(!fin.eof())
                                {
                                        string temp;
                                        getline(fin,temp);
                                        if(temp!="")
                                                mntc++;
                                }
                        }
                        fin.close();
                        string *names = new string[mntc];
                        string *locations = new string[mntc];
                        fin.open("mnt.txt");
                        mntc=0;
                        if(fin.is_open())
                        {
                                while(!fin.eof())
                                {
                                        string temp;
                                        getline(fin,temp);
                                        int flag=0;
                                        if(temp!="")
                                        {
                                                for(int j=0;j<temp.length();j++)
                                                {
                                                        if(temp[j]==' ')
                                                        {
                                                                flag=1;
                                                                continue;
                                                        }
                                                        else if(flag==0)
                                                                names[mntc]+=temp[j];
                                                        else
                                                                locations[mntc]+=temp[j];
                                                }
                                        }
                                        mntc++;
                                }
                        }
                        fin.close();
                        infile.open("intermediate.txt");
                        while(!infile.eof())
                        {
                                string line;
                                getline(infile,line);
                                int i=0,parts=0,pc=0;
                                while(i<line.length())
                                {
                                        if(line[i]==' ')
                                                parts++;
                                        i++;
                                }
                                string *arr = new string[parts+1];
                                i=0;
                                while(i<line.length())
                                {
                                        if(line[i]!=' ')
                                                arr[pc]+=line[i];
                                        if(line[i]==' ')
                                                pc++;
                                        i++;
                                }
                                flag=0;
                                for(int j=0;j<mntc-1;j++)
                                {
                                        if(arr[0]==names[j])
                                        {
                                                mdtc = stoi(locations[j])+1;
                                                fin.open("mdt.txt");
                                                for(int v=0;v<mdtc-2;v++)
                                                {
                                                        string temp;
                                                        getline(fin,temp);
                                                }
                                                buffer+=line+"\n";

                                                //tt is macro defintion in mdt
```

```
string tt;
getline(fin,tt);
int var=0,eqs;
for(int z=0;z<arr[1].length();z++)
{
        if(arr[1][z]==',')
                var++;
        else if(arr[1][z]=='=')
                eqs++;
}
var++;
string *ala = new string[var];
var=0;
for(int z=0;z<arr[1].length();z++)
{
        if(arr[1][z]==',')
                var++;
        else
        ala[var]+=arr[1][z];
}
var++;

int ands=0,eq=0;
for(int z=0;z<tt.length();z++)
{
        if(tt[z]=='&')
                ands++;
        if(tt[z]=='=')
                eq++;
}
string *alafinal = new string[ands];

if(ands>var)
{
        ands=-1;
        for(int z=0;z<tt.length();z++)
        {
                if(tt[z]=='&')
                        ands++;
                if(ands!=-1 && ands<var)
                        alafinal[ands]=ala[ands];
                else if(ands!=-1)
                        alafinal[ands]+=tt[z];
        }
        ands++;
}
else
{
        for(int z=0;z<ands;z++)
                alafinal[z]=ala[z];
}
//Remove =
for(int z=0;z<ands;z++)
{
```

```
                            string tmp="";
                            int flag=0;
                            for(int
zz=0;zz<alafinal[z].length();zz++)
                            {
                                if(alafinal[z][zz]=='=')
                                    flag=1;
                                else if(flag==1)
                                    tmp+=alafinal[z][zz];
                            }
                            if(tmp!="")
                                alafinal[z]=tmp;
                        }

                        int f;
                        for(int v=mdtc;v>0;v++)
                        {
                            string temp;
                            getline(fin,temp);
                            if(temp=="MEND")
                                break;
                            else
                            {
                                f=0;
                                for(int h=0;h<temp.length();h++)
                                {
                                    if(temp[h]=='#')
                                        f=1;
                                    else if(temp[h]==',')
                                    {
                                        if(f==1)
                                            f=0;
                                        buffer+=',';
                                    }
                                    else if(temp!="" && f==1)
                                    {
                                        int p =
int(temp[h])-48;
                                        buffer +=
alafinal[p];
                                    }
                                    else if(f==0)
                                        buffer+=temp[h];
                                }
                                buffer += "\n";
                            }
                        }
                        fin.close();
                        flag=1;
                    }
                }
                if (flag==0)
                    buffer += line!=""?line + "\n":"";
        }
```

```
                infile.close();
                outfile.open("output.txt");
                outfile<<buffer<<endl;
                outfile.close();
        }
};
int main()
{
        Pass1 pass1;
        pass1.run();
        Pass2 pass2;
        pass2.run();
        return 0;
}
```