**Part 1**

program fred(output);

begin

writeln('Hi, this is Fred');

end.

*od -x program1.pas*

**Part 2**

fpc -a -Tlinux program1.pas

**Part 3**

Program -> ProgramHeading “;” Block “.”

ProgramHeading -> "program" ProgramIdentifier

Block -> VariableDeclarationPart ProcedureAndFunctionDeclarationPart StatementPart

VariableDeclarationPart -> "var" VariableDeclaration ";" VariableDeclarationTail

VariableDeclarationTail -> VariableDeclaration ";" VariableDeclarationTail

VariableDeclaration -> Identifierlist ":" Type

Type -> “Integer” | “Float” | “String” | “Boolean”

ProcedureAndFunctionDeclarationPart -> ProcedureDeclaration

ProcedureAndFunctionDeclarationPart | FunctionDeclaration ProcedureAndFunctionDeclarationPart

FunctionDeclaration -> FunctionHeading ";" Block ";"

ProcedureHeading -> "procedure" procedureIdentifier OptionalFormalParameterList

FunctionHeading -> "function" functionIdentifier OptionalFormalParameterList ":" Type

OptionalFormalParameterList -> "(" FormalParameterSection FormalParameterSectionTail ")"

**Part 4**

**float\_liter** regular expression:

digit digit\* (E(+|-)digit digit\*)|. digit digit\*(E(+|-)digit digit\*)|ε

**identifier** regular expression:

(letter|\_)((letter|digit)|\_[^\_])((letter|digit)|\_[^\_])\*(letter|digit)

**whitespace**

(0xA|0xB|0XC|0xD|0x20|0x85|0xA0)+

Note: We weren’t sure how else to show a Regular Expression for whitespace characters so we chose to use the hex values of each whitespace ASCII character, this would be the way we’d check for these characters in a file as well.

**FSA**

