ECE3073 Computer Systems

Practice Questions

Program Design and Analysis: Assembler and Linking

i) Show the contents of the assembler's symbol table at the end of code generation for each line of the following programs (assume each instruction is 4 bytes long):

1)

```
        ORG   200
p1      ADR   r4, a
        LDR   r0, [r4]
        ADR   r4, e
        LDR   r1, [r4]
        ADD   r0, r0, r1
        CMP   r0, r1
        BNE   q1
p2      ADR   r4, e
```

Symbol table

p1	200
p2	228

2)

```
        ORG   100
p1      CMP   r0, r1
        BEQ   x1
p2      CMP   r0, r2
        BEQ   x2
p3      CMP   r0,r3
        BEQ   x3
```

Symbol table

p1	100
p2	108
p3	112

ii) A linker uses a single pass through a set of object files to find and resolve external references. Each object file is processed in the order given, all external references are found and then the previously loaded files are searched for labels that resolve those references. Will the linker be able to successfully load a program with the following external references and entry points? (explain your answer)

Object file	Entry points	External references
o1	a, b, c, d	s, t
o2	r, s, t	w, y, d
o3	w, x, y, z	a, c, d

No, because external references s and t will not be available to o1 and external references w and y will not be available to o2.