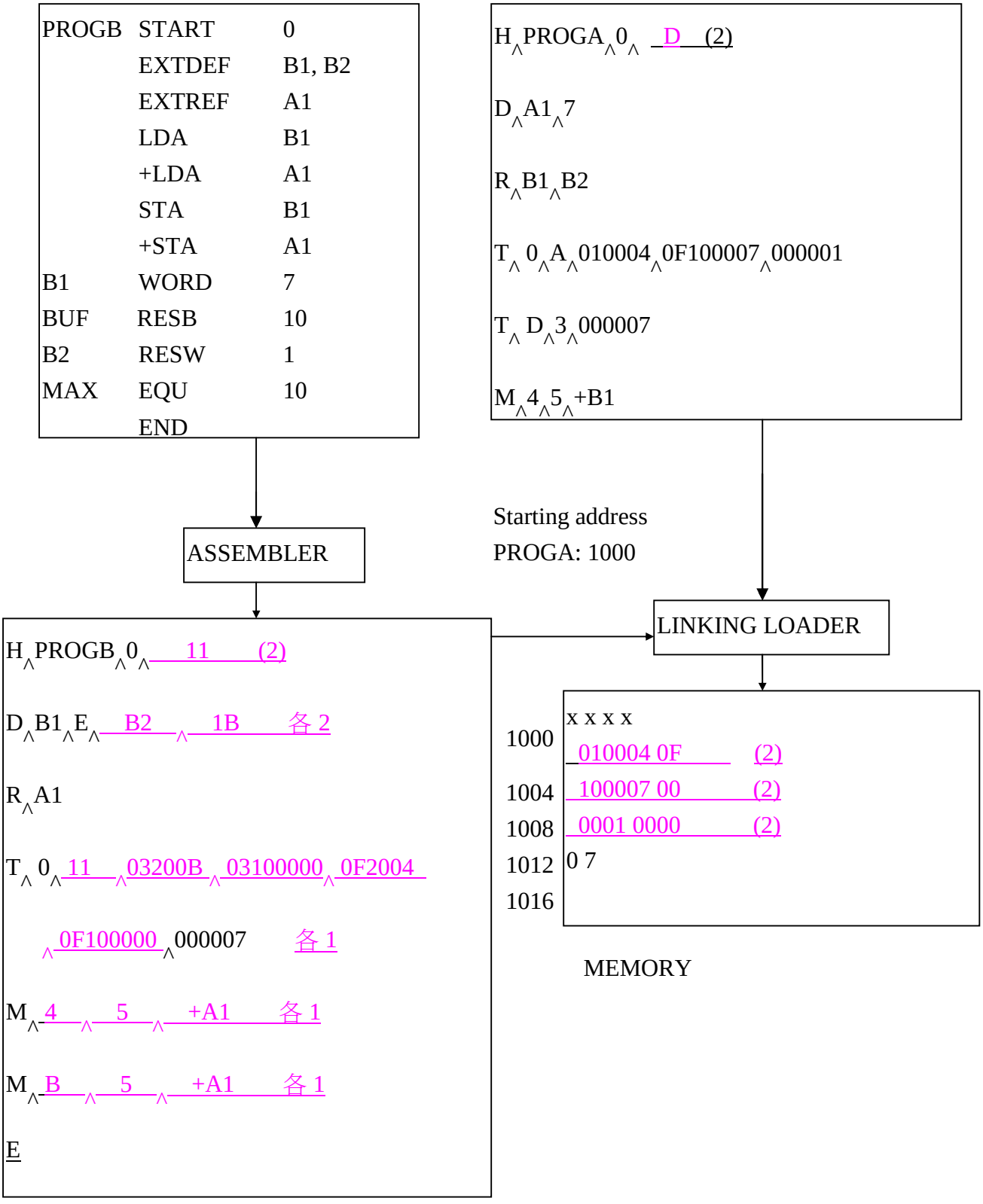
國立嘉義大學資訊工程學系系統程式小考考卷

學號：　　姓名：

1. Please write the content in the lines. (18%)
2.



NOTE: 1. The opcodes of LDA and STA are “00” and “0C”, respectively.
2. PROGB is placed after ROGA.
3. Each x represents 4 bits.

2. Please describe the behaviors of a macro processor in Pass1 and Pass2. What data structures do we need for such behaviors? (16%)

- All macro definitions are processed during the first pass.
- All macro invocation statements are expanded during the second pass.

- The macro definition are stored in a definition table DFETAB, which contains the macro prototype and the statement that make up the macro body.
- The macro names are entered into NAMTAB, which serves as an index to DFETAB.
  - NAMTAB contains two pointers to the beginning and the end of the definition in DEFTAB
- The third data structure is an argument table ARGTAB, which is used during the expansion of macro invocations.
  - When a macro invocation statement is recognized, the argument are stored in ARGTAB according to their position in the argument list.
  - As the macro is expanded, arguments from ARGTAB are substituted for the corresponding parameters in the macro body.

3. Please use the macro definition to expand the following macro invocation statement：

RDBUFF F2, BUFFER, LENGTH, (00, 03,04)

```
25   RDBUFF   MACRO   &INDEV,&BUFADR,&RECLTH,&EOR
27   &EORCT   SET     %NITEMS(&EOR)
30            CLEAR   X              CLEAR LOOP COUNTER
35            CLEAR   A
45           +LDT     #4096          SET MAX LENGTH = 4096
50   $LOOP    TD      =X'&INDEV'     TEST INPUT DEVICE
55            JEQ     $LOOP          LOOP UNTIL READY
60            RD      =X'&INDEV'     READ CHARACTER INTO REG A
63   &CTR     SET     1
64            WHILE   (&CTR LE &EORCT)
65            COMP    =X'0000&EOR[&CTR]'
70            JEQ     $EXIT
71   &CTR     SET     &CTR+1
73            ENDW
75            STCH    &BUFADR,X      STORE CHARACTER IN BUFFER
80            TIXR    T              LOOP UNLESS MAXIMUM LENGTH
85            JLT     $LOOP            HAS BEEN REACHED
90   $EXIT    STX     &RECLTH        SAVE RECORD LENGTH
100           MEND
```

(a)

```
.          RDBUFF   F2,BUFFER,LENGTH,(00,03,04)
```

```
30            CLEAR   X              CLEAR LOOP COUNTER
35            CLEAR   A
45           +LDT     #4096          SET MAX LENGTH = 4096
50   $AALOOP  TD      =X'F2'         TEST INPUT DEVICE
55            JEQ     $AALOOP        LOOP UNTIL READY
60            RD      =X'F2'         READ CHARACTER INTO REG A
65            COMP    =X'000000'
70            JEQ     $AAEXIT
65            COMP    =X'000003'
70            JEQ     $AAEXIT
65            COMP    =X'000004'
70            JEQ     $AAEXIT
75            STCH    BUFFER,X       STORE CHARACTER IN BUFFER
80            TIXR    T              LOOP UNLESS MAXIMUM LENGTH
85            JLT     $AALOOP          HAS BEEN REACHED
90   $AAEXIT  STX     LENGTH         SAVE RECORD LENGTH
```

(b)