

HAL/S Programming Review

Part 1

February 2000

1. Consider the following:

```
A:  PROGRAM;
    DECLARE SDC SCALAR DOUBLE CONSTANT(.3);
    DECLARE VDC VECTOR DOUBLE CONSTANT(.1, .2, .3);
    STRUCTURE STR RIGID:
        1 STR_SDC SCALAR DOUBLE;
    DECLARE STR STR-STRUCTURE CONSTANT(.3);
    DECLARE SD SCALAR DOUBLE INITIAL(.3);
    DECLARE ID INTEGER DOUBLE INITIAL(2);
    DECLARE ONE SCALAR INITIAL(1);
    DECLARE RESULT ARRAY(6) SCALAR DOUBLE;

    RESULT$1 = ONE .3;
    RESULT$2 = ONE SDC;
    RESULT$3 = ONE SD;
    RESULT$4 = ONE ID;
    RESULT$5 = ONE STR_SDC;
    RESULT$6 = ONE VDC$3;
```

Which of the above assignment statements use a single precision multiplication (if any) and which use a double precision multiplication (if any)? Circle either 'SP' or 'DP'.

```
RESULT$1 = SP  DP
RESULT$2 = SP  DP
RESULT$3 = SP  DP
RESULT$4 = SP  DP
RESULT$5 = SP  DP
RESULT$6 = SP  DP
```

2. Consider the following:

```
X:  COMPOOL RIGID;
    DECLARE A ARRAY(3) SCALAR INITIAL(1,2,3);
    DECLARE S SCALAR INITIAL(4);
    DECLARE I INTEGER INITIAL(5);
    DECLARE J INTEGER INITIAL(6);
    CLOSE;
```

```
D    INCLUDE TEMPLATE X
Y:   PROGRAM;
      S = 4;
      I = 5;
      J = 6;
      A$I = 0;
      CLOSE;
```

After program Y executes, what are the values of A, I, and J?

```
A =
I =
J =
```

3. Consider the following:

```
A:   PROGRAM;
      REPLACE SWAP (X,Y) BY
      "TEMP = X; X = Y; Y = TEMP";
      DECLARE SCALAR, X,Y,Z,TEMP;
      TEMP = 0;
      X = 1;
      Y = 2;
      Z = 3;
      SWAP (Z,X);
      CLOSE;
```

a. After program A executes, what are the values of X, Y, Z, and TEMP?

b. How would the HAL/S compiler expand SWAP(Y,X)?

4. In the following HAL/S statement, how many halfwords of memory will the variables I and J use?

```
      DECLARE I, J INTEGER;

I = _____ HW(s)

J = _____ HW(s)
```

5. Consider the following:

```
X:  COMPOOL RIGID;
    STRUCTURE S RIGID;
    1 SI INTEGER,
    1 SS SCALAR DOUBLE,
    1 SB BIT(16);
    DECLARE S S-STRUCTURE(2) INITIAL(1,2,HEX'3456');
    CLOSE;
```

What is the size of this compool in halfwords?

6. Consider the following:

```
X:  COMPOOL RIGID;
    DECLARE C CHARACTER(7) INITIAL('ABCDEF');
    DECLARE SP SCALAR INITIAL(1);
    DECLARE NS NAME SCALAR DOUBLE;
    DECLARE NR NAME ARRAY(3) INTEGER REMOTE;
    CLOSE;
```

What is the size of C, SP, NS, NR and the entire compool in halfwords?

C = _____ HW(s)

SP = _____ HW(s)

NS = _____ HW(s)

NR = _____ HW(s)

X = _____ HW(s)

7. Consider the following:

```
A:  PROGRAM;
    DECLARE I SCALAR INITIAL(200);
    DECLARE C INTEGER DOUBLE INITIAL(1);
    DECLARE F INTEGER DOUBLE INITIAL(2);
    C = CEILING(I**2 + .5);
    F = FLOOR(I**2 + .5);
    CLOSE;
```

a) After program A executes, what's the value of C?

b) After program A executes, what's the value of F?

8. Consider the following:

```
A:  PROGRAM;
    DECLARE COUNT INTEGER INITIAL(0);
    DECLARE B BIT(3) INITIAL(BIN'000');
    COUNT = 0;
    IF B = OFF THEN COUNT = COUNT + 1;
    B = ON;
    IF B = BIN'111' THEN COUNT = COUNT + 10;
    IF B = TRUE THEN COUNT = COUNT + 100;
    IF B = BIN'1' THEN COUNT = COUNT + 1000;
    IF B$1 = BIN'1' THEN COUNT = COUNT + 10000;
    CLOSE;
```

After program A executes, what's the value of COUNT?

9. Consider the following:

```
A:  PROGRAM;
    DECLARE COUNT INTEGER INITIAL(0);
    DECLARE B BIT(3) INITIAL(BIN'111');
    COUNT = 0;
    IF B = ON THEN COUNT = COUNT + 1;
    B = OFF;
    IF B = BIN'000' THEN COUNT = COUNT + 10;
    IF B = FALSE THEN COUNT = COUNT + 100;
    IF B = BIN'0' THEN COUNT = COUNT + 1000;
    IF B$1 = BIN'0' THEN COUNT = COUNT + 10000;
    CLOSE;
```

After program A executes, what's the value of COUNT?

10. Consider the following compool and procedure:

```
CMPOOL: COMPOOL RIGID;
  DECLARE CB BIT(16)          CONSTANT (HEX'CAFE');
  DECLARE CBD BIT(32)        CONSTANT (HEX'DEADBEEF');
  DECLARE CI INTEGER          CONSTANT (1);
  DECLARE CID INTEGER DOUBLE CONSTANT (2);
  DECLARE CS SCALAR           CONSTANT (3);
  DECLARE CSD SCALAR DOUBLE  CONSTANT (4);
  DECLARE CV VECTOR           CONSTANT (5, 6, 7);
  DECLARE CC CHARACTER(5)    CONSTANT ('THINK');
  DECLARE CAI ARRAY(2) INTEGER CONSTANT (8, 9);
CLOSE;
```

```
D INCLUDE TEMPLATE CMPOOL
PROC: PROCEDURE;
  DECLARE B BIT(16)          INITIAL (HEX'FADE');
  DECLARE BD BIT(32)        INITIAL (HEX'DEFACED0');
  DECLARE I INTEGER          INITIAL (1);
  DECLARE ID INTEGER DOUBLE INITIAL (2);
  DECLARE S SCALAR           INITIAL (3);
  DECLARE SD SCALAR DOUBLE  INITIAL (4);
  DECLARE V VECTOR           INITIAL (5, 6, 7);
  DECLARE C CHARACTER(5)    INITIAL ('4 HWS');
  DECLARE AI ARRAY(2) INTEGER INITIAL (8, 9);
  B = CB;
  BD = CBD;
  I = CI;
  ID = CID;
  S = CS;
  SD = CSD;
  V = CV;
  C = CC;
  AI = CAI;
CLOSE;
```

- a) What is the size of CMPOOL (#PCMPOOL)?
- b) What is the size of the local data area for PROC (#DPROC)?
- c) While working a chit for STS-99, it becomes necessary to write a GMEM to change the constant CI. What is the name of the CSECT to be patched (assume that PROC is the only module that references CI)?