

HAL/S PROGRAMMING FUNDAMENTALS QUIZ 3

1. Which of the following is correct:
 - a) REPLACE INCR_CTR BY 'ICTR = ICTR + 1';
 - b) REPLACE INCR_CTR BY "ICTR = ICTR + 1";Ans. _____

2. Concerning the previous question, can you explain why the HAL/S compiler would be forced to use one delimiter rather than the other? Ans. _____

3. What is the value of K in the following situation?
DECLARE INTEGER, I, J, K;
I = 20;
J = 7;
K = I/J; Ans. _____

4. True or False. HAL/S does not allow the T (Transpose) operator to be applied to vectors (e.g., VECT**T). Ans. _____

5. True or False. A blank is needed in the following case to indicate the multiplication:
B = 3 (I + J) Ans. _____

6. True or False. The following three expressions are completely equivalent (will generate the same object code):
 - a) B**.5
 - b) B**(1/2)
 - c) SQRT(B)Ans. _____

7. True or False. An integer raised to a positive integer power will be evaluated as an integer. All other cases of a number raised to a power will yield a scalar result. Ans. _____

8. In the case of a matrix raised to a power (MATRIX**I), which of the following statements are false?:
 9. MATRIX must be a square matrix (equal numbers of rows and columns).
 10. The value of I must be known at compile time
 11. I cannot have the value 0.
 12. If I is -1 the expression is equivalent to finding the inverse of MATRIX.Ans. _____

9. True or False. The following code will produce the inverse of the matrix MM1:

```
DECLARE MATRIX, MM1 INITIAL(3#(1,2,3)), MM2 INITIAL(0);  
DECLARE T INTEGER INITIAL(-1);  
MM2 = MM1**T;
```

Ans. _____

10, True or False. Matrix transpose operations are performed by rather slow library subroutines and should thus be avoided when possible. Vector transpose operations are, however, very quick.

Ans. _____

11. True or False. The sole CHARACTER string operator is concatenation (||).

Ans. _____

12. True or False. Integers and Scalars are automatically converted to appropriate character strings whenever they are concatenated with a character string or assigned to a string or substring.

Ans. _____

13. True or False. The BIT string operators are a) AND (&), b) OR (|), c) NOT (~), and d) concatenation (||).

Ans. _____

14. True or False. The negation operator (-) has a higher precedence than exponentiation (**).

Ans. _____

15. True or False. Sequences of operators of the same precedence are evaluated from left to right – except in the case of exponentiation (**) and division (/) which are evaluated from right to left.

Ans. _____

16. What is the value of 2^{3^2} ?

Ans. _____

17. True or False. The Boolean operator AND (&) is of higher precedence than OR (|).

Ans. _____

18. Which of the following will give a different value from the other two expressions?

a) $A/B/C$ b) $(A/B)/C$ c) $A/(B/C)$ Ans. _____

19. True or False. The following vector conversion function will result in the run-time formation of a single precision 3-vector: VECTOR(1)

Ans. _____

20. What keyword is used in the subscript of a vector or matrix conversion function to force a double precision result?

Ans. _____

31. True or False. The following code sequence will not compile:

```
DECLARE BOOLEAN, B1 INITIAL(TRUE);  
DECLARE SCALAR INITIAL(2), S1, S2;  
IF B1 | S1 < S2 THEN  
    S1 = S2;
```

Ans. _____

32. Examples of ARITHMETIC operators are: **, /, *, +, ...

Examples of COMPARATIVE operators are: <, >, =, \neq , ...

Examples of LOGICAL/BIT operators are: &, |, \neg

True or False. In a relational expression ARITHMETIC operators have higher precedence than COMPARATIVE operators, and the latter in turn have higher precedence than LOGICAL operators.

Ans. _____

33. True or False. There must be one and only one label on PROGRAM, COMPOOL, PROCEDURE, and FUNCTION header statements.

Ans. _____

34. True or False. Simple DO... END groups are frequently needed in demarcate the THEN and ELSE parts of an IF statement. The DO and END statements are considered executable statements, but usually very little code is generated for them (perhaps a branch/jump statement).

Ans. _____

35. Which is the BOOLEAN expression:

a) $IVAL \leq I + J$

b) $MAT1 \neq MAT2$

c) $B1 \& (B2 | \neg B3)$

Ans. _____

36. True or False. The DO WHILE (condition) ... END loop will execute at least once. Then, if the (condition) is false the loop will be terminated.

Ans. _____

37. True or False. As a rule RELATIONAL expressions produce faster, more efficient code than BOOLEAN expressions.

Ans. _____

38. True or False. The following code will compile successfully:

```
BIG_LOOP:      DO FOR I = 1 TO 5;  
                ... (omitted code) ...  
BIG_LOOP:      END;
```

Ans. _____

39. True or False. The only time the '*' symbol is used to mean any form of multiplication is in the vector cross-product: $V = W * Z$;

Ans. _____