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/*
Write a function that converts a decimal to a binary number, one that returns the sum of
the digits of the a given number and one that return the reverse of a number.
*/

CREATE OR REPLACE FUNCTION dtb(pd IN NUMBER) RETURN VARCHAR2 AS
b VARCHAR2(50);
vd NUMBER := pd;
BEGIN
   IF vd IS NOT NULL THEN
      WHILE (vd > 0) LOOP
         b := mod(vd, 2) || b;
         vd := trunc(vd/2);
      END LOOP;
   ELSE
      b := 0;
   END IF;
   RETURN b;
END;

SET SERVEROUTPUT ON
DECLARE nd NUMBER := &vnd;
BEGIN
DBMS_OUTPUT.PUT_LINE('Number '||nd|| ' in binary is '||dtb(nd));
END;


CREATE OR REPLACE FUNCTION sum_digits(pd IN NUMBER) RETURN NUMBER AS
the_sum NUMBER := 0;
vd NUMBER := pd;
BEGIN
   IF vd IS NOT NULL THEN
      WHILE (vd > 0) LOOP
         the_sum := the_sum + mod(vd, 10);
         vd := trunc(vd/10);
      END LOOP;
   END IF;
   RETURN the_sum;
END;

SET SERVEROUTPUT ON
DECLARE nd NUMBER := &vnd;
BEGIN
DBMS_OUTPUT.PUT_LINE('Sum of digits of '||nd|| ' is '||sum_digits(nd));
END;

CREATE OR REPLACE FUNCTION reverse_num(pd IN NUMBER) RETURN NUMBER AS
vd NUMBER := pd;
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rev_num NUMBER := 0;
BEGIN
   IF vd IS NOT NULL THEN
      WHILE (vd > 0) LOOP
         rev_num := rev_num * 10 + mod(vd, 10);
         vd := trunc(vd/10);
      END LOOP;
   END IF;
   RETURN rev_num;
END;

SET SERVEROUTPUT ON
DECLARE nd NUMBER := &vnd;
BEGIN
DBMS_OUTPUT.PUT_LINE('Reverse of '||nd|| ' is '||reverse_num(nd));
END;
```

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/*
Write a function taht computes the following sum: 1!+2!+3!+ ...+n!.
*/

CREATE OR REPLACE FUNCTION factorial(pd IN NUMBER) RETURN NUMBER AS
factorial NUMBER := 1;
vd NUMBER := pd;
BEGIN
   FOR i IN 1..vd LOOP
         factorial := factorial * i;
   END LOOP;
   RETURN factorial;
END;

CREATE OR REPLACE FUNCTION factorial_sum(pd IN NUMBER) RETURN NUMBER AS
vd NUMBER := pd;
the_fact_sum NUMBER := 0;
BEGIN
   FOR i in 1..vd LOOP
      the_fact_sum := the_fact_sum + factorial(i);
   END LOOP;
   RETURN the_fact_sum;
END;

SET SERVEROUTPUT ON
DECLARE nd NUMBER := &vnd;
BEGIN
DBMS_OUTPUT.PUT_LINE('Number '||nd|| ' in binary is '||factorial_sum(nd));
END;
```

```
/*
Some sums calculations.
*/
CREATE OR REPLACE FUNCTION sum1(pd IN NUMBER) RETURN NUMBER AS
vd NUMBER := pd;
the_sum NUMBER := 0;
BEGIN
   FOR i in 1..vd LOOP
      the_sum := the_sum + 1/((3*i+1)*(3*i-2));
   END LOOP;
   RETURN the_sum;
END;

SET SERVEROUTPUT ON
DECLARE nd NUMBER := &vnd;
BEGIN
DBMS_OUTPUT.PUT_LINE('The 1st sum is '||sum1(nd));
END;

CREATE OR REPLACE FUNCTION sum2(pd IN NUMBER) RETURN NUMBER AS
vd NUMBER := pd;
the_sum NUMBER := 0;
BEGIN
   FOR i in 1..vd LOOP
      the_sum := the_sum + 1/(i*(i+1)*(i+2));
   END LOOP;
   RETURN the_sum;
END;

SET SERVEROUTPUT ON
DECLARE nd NUMBER := &vnd;
BEGIN
DBMS_OUTPUT.PUT_LINE('The 2st sum is '||sum2(nd));
END;



/*
Some sums calculations.
*/

CREATE OR REPLACE FUNCTION sum1(pd IN NUMBER) RETURN NUMBER AS
vd NUMBER := pd;
the_sum NUMBER := 0;
BEGIN
   FOR i in 1..vd LOOP
      the_sum := the_sum + sqrt(i+1) - sqrt(i);
   END LOOP;
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   RETURN the_sum;
END;

SET SERVEROUTPUT ON
DECLARE nd NUMBER := &vnd;
BEGIN
DBMS_OUTPUT.PUT_LINE('The 1st sum is '||sum1(nd));
END;

CREATE OR REPLACE FUNCTION sum2(pd IN NUMBER) RETURN NUMBER AS
vd NUMBER := pd;
the_sum NUMBER := 0;
BEGIN
   FOR i in 1..vd LOOP
      the_sum := the_sum + (2*i-1)/power(2,i);
   END LOOP;
   RETURN the_sum;
END;

SET SERVEROUTPUT ON
DECLARE nd NUMBER := &vnd;
BEGIN
DBMS_OUTPUT.PUT_LINE('The 2st sum is '||sum2(nd));
END;
```