|  |  |  |  |
| --- | --- | --- | --- |
| **Nama** | Edgrant Henderson Suryajaya | **Kode Asisten** | ………………………… |
| **NPM** | 2206025016 | **Jenis Tugas** | TP/CS…………………. |

**Jawaban**

1. Code

library IEEE;

use IEEE.STD\_LOGIC\_1164.ALL;

use IEEE.NUMERIC\_STD.ALL;

use IEEE.MATH\_REAL.ALL;

entity TP\_PSD7\_EdgrantHendersonSuryajaya\_2206025016 is

    port (

        CLK : in std\_logic;

        Done : out std\_logic;

        averageTemperature, dailyTemperatureChange, averageBranch, dailyBranchChange : in integer;

        numberOfDays : in integer

    );

end TP\_PSD7\_EdgrantHendersonSuryajaya\_2206025016;

architecture rtl of *TP\_PSD7\_EdgrantHendersonSuryajaya\_2206025016* is

begin

    process

        variable seed1: integer := 1519;

        variable seed2: integer := 9329;

        --function IntroduceVariant

        impure function IntroduceVariant return integer is

            variable r : real;

        begin

            uniform(seed1, seed2, r);

            return integer(round(r \* real(5)));

        end function;

        --function CalculateTemperature

        function CalculateTemperature(averageTemperature, dailyTemperatureChange, introduceVariant : integer) return integer is

            variable dailyTemperature : integer range 100 to 500;

        begin

            dailyTemperature := averageTemperature + dailyTemperatureChange + (introduceVariant \* dailyTemperatureChange);

            return dailyTemperature;

        end function;

        --function CalculateBranch

        function CalculateBranch(averageBranch, dailyBranchChange, introduceVariant : integer) return integer is

            variable dailyBranch : integer range 0 to 100;

        begin

            dailyBranch := averageBranch + dailyBranchChange + (introduceVariant \* dailyBranchChange);

            return dailyBranch;

        end function;

        --procedure simulasi

        procedure SimulateSacredTimeline(

            signal numberOfDays, averageTemperature, dailyTemperatureChange, averageBranch, dailyBranchChange : in integer;

            signal CLK : in std\_logic;

            signal Done : out std\_logic

        ) is

            variable dailyTemperature, dailyBranch : integer;

        begin

            Done <= '0';

            for i in 1 to numberOfDays loop

                dailyTemperature := CalculateTemperature(averageTemperature, dailyTemperatureChange, IntroduceVariant);

                dailyBranch := CalculateBranch(averageBranch, dailyBranchChange, IntroduceVariant);

                report "dailyTemperature = " & integer'image(dailyTemperature);

                report "dailyBranch = " & integer'image(dailyBranch);

                -- wait until rising\_edge(CLK);

            end loop;

            Done <= '1';

            wait;

        end procedure;

    begin

        SimulateSacredTimeline(numberOfDays, averageTemperature, dailyTemperatureChange, averageBranch, dailyBranchChange, CLK, Done);

    end process;

end rtl;

1. Simulasi.

A screenshot of a computer

Description automatically generated

# \*\* Note: dailyTemperature = 183

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 15

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyTemperature = 183

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 16

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyTemperature = 171

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 13

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyTemperature = 171

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 16

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyTemperature = 159

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 15

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyTemperature = 171

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 15

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyTemperature = 159

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 15

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyTemperature = 171

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 14

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyTemperature = 183

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 16

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyTemperature = 159

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

# \*\* Note: dailyBranch = 17

# Time: 0 ps Iteration: 0 Instance: /tp\_psd7\_edgranthendersonsuryajaya\_2206025016

1. Data random menggunakan uniform yang menerima 3 parameter. 2 seed, yang akan digunakan untuk generate pseudo randomnya dan juga setelah digunakan akan diubah. Dan juga parameter yang berbentuk suatu variabel yang akan diisi angka pseudo random dari 0 ke 5.