**Module: SV for Verification**

**Section:** Arrays **Task:** Usage of Array Methods

**Task**

Usage of Array Methods

1. **Suppose a dynamic array of integers ( myvalues ) is initialized to values as [ 2, 4, 5, 3, 1, 8, 6, 2, 7, 3]. Write a code to find all elements greater than 3 in the array using array locator method “ find ”?**
   * **Code Snippet:**

// Author: Noman Rafiq

// Dated: Aug 31, 2024

module tb;

// Initialize a dynamic array

int array[] = '{2,4,5,3,1,8,6,2,7,3}, result[$];

initial begin

result = array.find with (item > 3);

foreach(result[i]) $display("result[%0d] = %0d", i, result[i]);

end

endmodule

1. **Resizing a dynamic array:**

This can be done using a **new[ ]** constructor to set a new size for the array. In order to preserve the original values, we need to pass the array pointer for the original array values. This is demonstrated in the following code snippet:

* + **Code Snippet:**

// Author: Noman Rafiq

// Dated: Aug 31, 2024

module tb;

int array[]; // Declare a dynamic Array

initial begin

// Display Size

$display("Array Size is: %0d", array.size());

// Allocate Size for 100 elements

array = new[100];

// Initialize elements

foreach(array[i]) array[i] = i + 1;

// Display New-Size

$display("Array Size is now: %0d", array.size());

// Re-Size the array to hold 200 elements and preserve the origianl 100

array = new[200](array);

// Display New-Size

$display("Array Size is now: %0d", array.size());

// Display Presrved Elements

foreach(array[i]) $display("a[%0d] = %0d", i, array[i]);

end

endmodule

1. **What is the difference between “new ()” and “new []”?**
   * **new( ):**

It is also called a class constructor that initializes a class object. When an

object is created, for example,

Packet p = new;

the system executes the new function associated with the class:

class Packet;

integer command;

function new();

command = IDLE;

endfunction

Endclass

As shown above, new is now being used in two very different contexts with very different semantics. The variable declaration creates an object of class Packet. In the course of creating this instance, the new() function is invoked, in which any specialized initialization required can be done.

* + **new[ ]:**

The new constructor sets the size of a dynamic array and initializes its elements. It may appear in place of the right-hand side expression of variable declaration assignments and blocking procedural assignments when the left-hand side indicates a dynamic array.

1. **Which of the array types: dynamic array or associative array, are good to model really large arrays, say: a huge memory array of 32KB? Explain your answer.**

For modeling a large, dense memory array like 32KB, where every possible index from 0 to 32767 is likely to be used, a dynamic array is a better choice.

Dynamic arrays provide efficient memory usage and fast access times for large contiguous blocks of memory, which matches the typical use case for memory arrays.

If the 32KB memory array is sparse (e.g., only a few addresses within the 32KB range are used), then an associative array could be considered for better memory efficiency.

However, for standard dense memory modeling, dynamic arrays are generally the preferred option.