Due on 2021-09-22, 23:59 IST.

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Course outline
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How does an NPTEL online course work?

Prerequisite: Week 0

Week1: Introduction to Cbased VLSI Design

Week2: C-Based VLSI Design: Basic Scheduling

Week3: C-Based VLSI

Design: List Based Scheduling Week 4: C-Based VLSI

Design: Advanced Scheduling

Week 5: C-Based VLSI

Design: Allocation and

Binding Week 6: C-Based VLSI Design: Allocation, Binding,

Data-path and Controller Generation Week 7: C-Based VLSI

C Code Week 8: C-Based VLSI

Design: Efficient Synthesis of

Design: Hardware Efficient C Coding

- Lec1: Hardware Efficient C Coding
- Lecture Note for Lec1
- Lec2: Hardware Efficient C Coding – part II
- Lec3: Dataflow Optimization

Lecture Note for Lec2

- in HLS
- Lecture Note for Lec3
- Quiz: Week 8: Assignment 8 Week 8: Feedback Form
- Solution: Assignment 8

Week 9: C-Based VLSI

Optimizations in Hardware

**Design: Impact of Compiler** 

Week 10: Verification of Highlevel Synthesis

Week 11: Securing Design with High-level Synthesis

Week 12: Introduction to EDA and Recent Advances in C-Based VLSI Design

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Live Sessions

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Week 8: Assignment 8
```

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

1) Which of the below code segments will be synthesizable by Vivado HLS? (Remember: main() function is used for testing the function to be 2 points synthesized and usually not synthesized to hardware)

```
I.
#include <stdio.h>
void test(int d[10])
     int acc = 0;
     int i;
     for (i=0; i<10; i++)
           acc += d[i];
           d[i] = acc;
#ifndef __SYNTHESIS__
int main ()
     int d[10], i;
     for (i=0; i<10; i++)
           d[i] = i;
     test(d);
     for(i=0;i<10;i++)
           printf("%d %d\n", i, d[i]);
     return 0;
#endif
```

```
Η.
#include <stdio.h>
void test(int d[10])
     int acc = 0;
     int I, x;
     for (i=0; i<10; i++)
          acc += d[i] + fscanf("&d", x);
           d[i] = acc;
int main ()
     int d[10], i;
     for(i=0;i<10;i++)
           d[i] = i;
     test(d);
     for(i=0;i<10;i++)
          printf("%d %d\n", i, d[i]);
     return 0;
```

```
III.
      unsigned foo (unsigned n)
           if (n == 0 || n == 1) return 1;
           return (foo(n-2) + foo(n-1));
IV.
      #include <stdio.h>
     int main ()
           int d[10], i;
           for(i=0;i<10;i++)
                 d[i] = i;
           test(d);
           for (i=0; i<10; i++)
                 printf("%d %d\n", i, d[i]);
           return 0;
```

```
No, the answer is incorrect.
```

 $\bigcirc$  I

Score: 0

void top (int A[], int \*\*n)

Accepted Answers:

that array A is stored in single port BRAM at interface.

2) What is the least number of Array Accesses for this particular code after array access is minimized for the array A by code rewriting? Assume O points

```
for( i = 1; i < 5; i++)
           n[i] = A[i-1] + A[i+1] + A[i+2];
6
```

07 8

9

No, the answer is incorrect. Score: 0 Accepted Answers:

3) Which of these is anti-dependency? Read after Write (RAW)

 Read after Read RAR Write after Write

No, the answer is incorrect.

Write after Read (WAR)

Score: 0 Accepted Answers: Write after Read (WAR)

False dependencies can restrict:

 loop tiling loop pipelining

 loop unrolling array partitioning

Score: 0 Accepted Answers: loop pipelining

No, the answer is incorrect.

S1: Dynamic memory allocation is not supported in HLS tools because the dynamic needs of memory cannot be supported in a fixed architecture like

Consider the two statements given below:

1 point

1 point

1 point

1 point

FPGA or ASIC. S2: System calls are not supported in HLS because there is no operating system for dedicated architectures.

Both S1 and S2 are true. Only S1 is true.

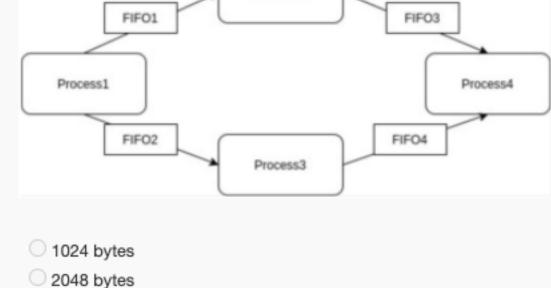
- Only S2 is true.
- Neither S1 or S2 is true.

Accepted Answers: Both S1 and S2 are true.

No, the answer is incorrect. Score: 0

Consider the figure below. The amount of memory required for these FIFO buffers is 1024 bytes. If they are replaced by PING PONG buffers, what will be the memory required?

Process2



## No, the answer is incorrect. Score: 0 Accepted Answers:

Can not be determined

2048 bytes 7) Dataflow optimizations cannot be applied for:

512 bytes

 Bypassing tasks. Feedback between tasks.

Single-producer-consumer violations.

All of the above scenerios. No, the answer is incorrect.

Score: 0 Accepted Answers:

8) Which of the below type qualifiers cannot be synthesized by High-Level Synthesis?

All of the above scenerios.

static

1 point

1 point

opointer

const

- None of the above
- Score: 0 Accepted Answers: None of the above

No, the answer is incorrect.