

## Bio Photonics Simulator

<http://nanohub.org/resources/biophotonicsim>

For this lab, we will create text file inputs for our tool and run our tool with these inputs. We will use an online C compiler

<http://ideone.com/>

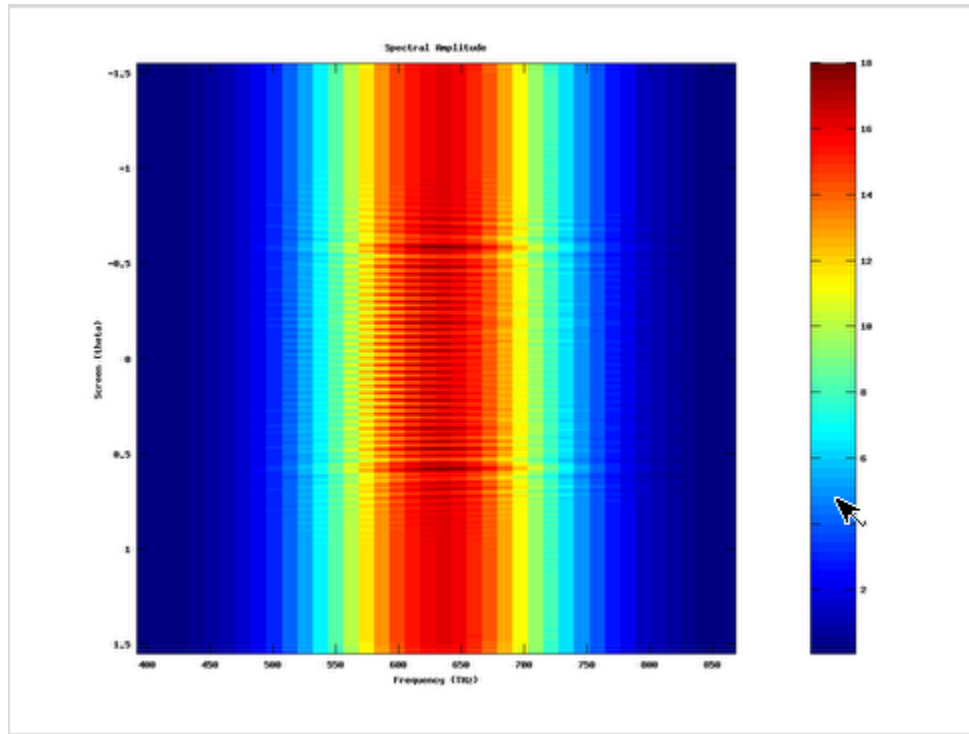
to run our code. Then we will copy and paste our input into a text file.

```
#include <stdio.h>
int row(int i){
    int answer;
    answer=i%2; //This is the only line of code you will ever change :)
    return answer;
}
int main(){
    int i,j;
    for(i=0;i<128;i++){
        for(j=0;j<2;j++) printf("%d ",row(i));
        printf("\n");
    }
    return 0;
}
```

We will start off by running this simulation with the output txt you have created. We will change 3 things from the default version of the tool.

- 1 and 2. under Image Parameters
  - under image co-ordinates
  - Make m=1, n=1 and p=64
3. under Image Parameters
  - under Other Parameters
  - under Example
  - choose Upload...
  - choose Copy/paste text
  - paste your output text in the space provided

Run your simulation. Choose Frequency Spectrum at Screen K from the "Result" bar at the



top.

#### Question 1.

- When you simulate using “answer=i%2;”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?

#### Question 2.

- When you simulate using “answer=i%4;”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?

#### Question 3.

- When you simulate using “answer=i%8;”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?

#### Question 4.

- When you simulate using “answer=i%16;”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?

- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?

**Question 5.**

- When you simulate using “answer=i%32;”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?

**Question 6.**

- How does doubling the period of our steps affect the separation of the peaks in the amplitude vs frequency plots?
- Did you expect this due to properties of the Fourier transform?

**Question 7.**

- When you simulate using “answer=i/32;”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?

**Question 8.**

- When you simulate using “answer=i/16;”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?

**Question 9.**

- When you simulate using “answer=i/8;”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?

**Question 10.**

- When you simulate using “answer=i/4;”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?

**Question 11.**

- When you simulate using “answer= $i/2$ ”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?

**Question 12.**

- When you simulate using “answer= $i$ ”, is there much change of the amplitude as the angle changes?
- Is there a diffraction like pattern?
- Is the difference in amplitude between the peaks and valleys huge or small?
- How do the amplitude vs theta and frequency plot and the previous plot compare?