Assignment

Course title: Physics II

Course code: PHY-123

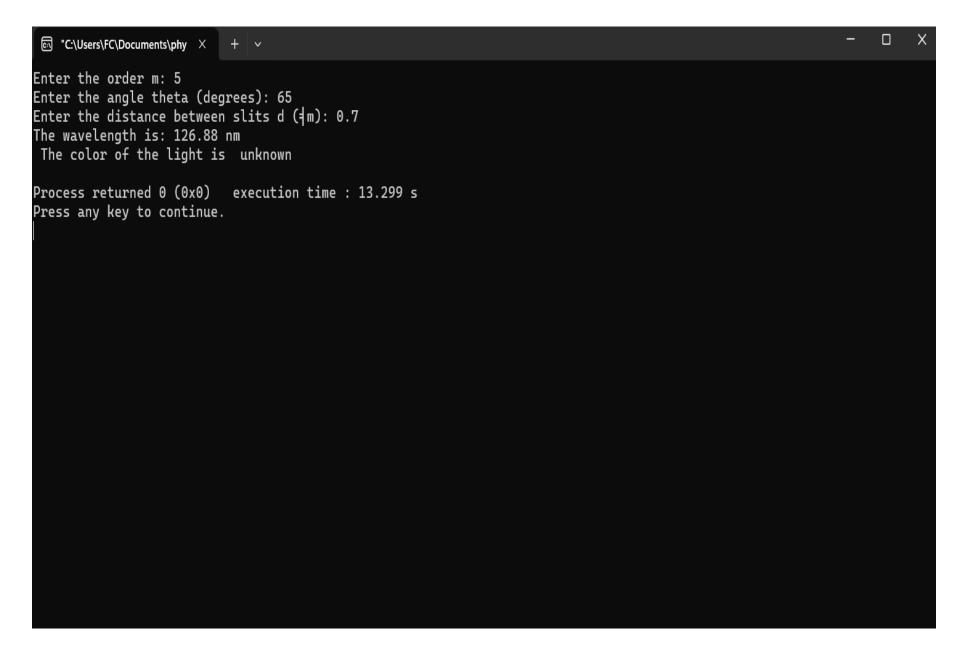
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Problem 1

```
#include <stdio.h>
#include <math.h>
int main() {
  int m;
  double theta, d;
  double wavelength;
  // Input the order of the maxima
  printf("Enter the order m: ");
  scanf("%d", &m);
  printf("Enter the angle theta (degrees): ");
  scanf("%lf", &theta);
  printf("Enter the distance between slits d (μm): ");
  scanf("%lf", &d);
  // degrees to radians
  double theta rad = theta * M PI / 180.0;
  // micrometers to meters
  d *= 1e-6;
  // Calculate the wavelength in meters
  wavelength = (d * sin(theta_rad)) / m;
  // wavelength from meters to nanometers
  wavelength *= 1e9;
  printf("The wavelength is: %.2f nm\n", wavelength);
  if (wavelength >= 380 && wavelength < 450) printf( "The color of the light is violet\n");
  if (wavelength >= 450 && wavelength < 485) printf( "The color of the light is blue\n");
  if (wavelength >= 485 && wavelength < 500) printf("The color of the light is cyan\n");
  if (wavelength >= 500 && wavelength < 565) printf("The color of the light is green\n");
  if (wavelength >= 565 && wavelength < 590) printf( "The color of the light is yellow\n");
  if (wavelength >= 590 && wavelength < 625) printf("The color of the light is orange\n");
  if (wavelength \geq 625 && wavelength \leq 750) printf( "The color of the light is red\n");
  else printf(" The color of the light is unknown\n");
  return 0;
}
```



Problem 2

```
#include <stdio.h>
#include <math.h>
int main() {
  double lambda green = 530e-9; // 530 nm to meters
  double theta_green = 65.0;
  int m_green = 3;
  double lambda_red = 700e-9; // 700 nm to meters
  int m red = 2;
           // degrees to radians
  double theta green rad = theta green * M PI / 180.0;
  // Calculate grating spacing d using green light data
  double d = (m green * lambda green) / sin(theta green rad);
  // Calculate the angle for the red light
  double sin theta red = (m_red * lambda_red) / d;
     // Check if the calculated sin_theta_red is within the valid range [-1, 1]
  if (sin_theta_red > 1.0 | | sin_theta_red < -1.0) {
    printf("No valid angle for the given parameters.\n");
  } else {
    // Calculate the angle in degrees
    double theta_red_rad = asin(sin_theta_red);
    double theta_red = theta_red_rad * 180.0 / M_PI;
    // Output the result
    printf("The angle for the second-order bright spot for red light is: %.2f
degrees\n", theta_red);
  return 0;
```

