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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » An Introduction To Programming Through C++ (course)

Announcements (announcements) **About the Course (https://swayam.gov.in/nd1_noc20_cs53/preview)**

Ask a Question (forum) Progress (student/home) Mentor (student/mentor)

Unit 6 - Week 4

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

Week 4

- Lecture 8 : Computing Mathematical Functions Part 1 : Taylor series (unit?unit=57&lesson=58)
- Lecture 8 : Computing Mathematical Functions Part 2 : Numerical integration (unit?unit=57&lesson=59)

Week 4 Quiz

The due date for submitting this assignment has passed. Due on 2020-02-26, 23:59 IST.
As per our records you have not submitted this assignment.

1) The numerical integration program discussed in the lecture estimates the area under the curve f(x) between p+iw and p+(i+1)w by f(p+iw)*w. Which of the following is true ***1 point***

- The answer produced by the program will exactly equal ln(x).
- The answer produced by the program will be larger than ln(x).
- The answer produced by the program will be smaller than ln(x).
- The answer produced by the program may be smaller or larger than ln(x) depending upon the value of x.

No, the answer is incorrect.
Score: 0
Accepted Answers:
The answer produced by the program will be larger than ln(x).

2) I wish to find ln(x) given x. Which of the following is/are correct? ***1 point***

- Using Taylor series will be convenient.
- Using Bisection method will be convenient.
- Using Newton-Raphson method will be convenient.
- None of the 3 methods mentioned above will be convenient.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Using Taylor series will be convenient.

3) ***1 point***

Lecture 8 : Computing Mathematical Functions Part 3 : Bisection Method (unit?unit=57&lesson=60)

Lecture 8 : Computing Mathematical Functions Part 4 : Newton Raphson Method (unit?unit=57&lesson=61)

Lecture 9 : Loops in various applications Part 1 : Loops in various applications brute force algorithms (unit?unit=57&lesson=62)

Lecture 9 : Loops in various applications Part 2 : Finding Pythagorean Triples (unit?unit=57&lesson=63)

Lecture 9 : Loops in various applications Part 3 : Modelling a system: bargaining (unit?unit=57&lesson=64)

Lecture 9 : Loops in various applications Part 4 : Simulating a water tank (unit?unit=57&lesson=65)

Lecture 9 : Loops in various applications Part 5 : Arithmetic on very large numbers (unit?unit=57&lesson=70)

Quiz : Week 4 Quiz (assessment?name=173)

We wish to calculate the sine of 1.5 radians. One way (Method A) is to use Taylor series as was discussed in the lecture. Another way (Method B) is to note that sin(x) = cos(PI/2 - x). So we will instead calculate cos(PI/2 - 1.5) = cos(0.07) assuming PI=3.14.
Specifically we will use the series:

$$\cos(y) = 1 - y^2/2! + y^4/4! - y^6/6!...$$

With y = 0.07, which of the following is/are true (You can either expand out the series and see which terms are likely to become smaller quickly or write a program and see directly) :

- [ ] We will get as good an answer as we want if we take sufficiently many terms in either method A or method B.
- [ ] We will need fewer terms to get a good answer in method A than in method B.
- [ ] We will need fewer terms to get a good answer in method B than in method A.
- [ ] We will need the same number of terms to get a good answer in method A and method B.

No, the answer is incorrect.
Score: 0

Accepted Answers:
We will get as good an answer as we want if we take sufficiently many terms in either method A or method B.
We will need fewer terms to get a good answer in method B than in method A.

In the lectures we discussed the Newton Raphson method to find square roots. The code given was:

```
double y; cin >> y;
double xi=1;
while(abs(xi*xi – y) > 0.001){
    xi = (xi + y/xi)/2 ;
}
cout << xi << endl;
```

Select from the following, the codes that are equivalent to the above.

4) // Code .. ***1 point***

```
double y; cin >> y;
for(double xi=1; abs(xi*xi – y) > 0.001; xi = (xi + y/xi)/2){}
   // yes, empty body
 cout << xi << endl;
```

- Equivalent
- Not Equivalent

No, the answer is incorrect.
Score: 0

Accepted Answers:
Not Equivalent

5) // Code .. ***1 point***

```
double y; cin >> y;
double xi=1;
for( ; abs(xi*xi – y) > 0.001; xi = (xi + y/xi)/2){}
```

Week 4 Programming Assignment 1 (/noc20_cs53/progassignment?name=174)

Week 4 Programming Assignment 2 (/noc20_cs53/progassignment?name=175)

Download Videos (unit?unit=57&lesson=180)

Weekly Feedback (unit?unit=57&lesson=192)

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Text Transcripts

```
  // yes, empty body
cout << xi << endl;
```

- Equivalent
- Not Equivalent.

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

6) // Code .. ***1 point***

```
double y; cin >> y;
double xi;
for(xi=1; abs(xi*xi – y) > 0.001; ){
  xi = (xi + y/xi)/2;
}
cout << xi << endl;
```

- Equivalent
- Not Equivalent

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

7) // Code .. ***1 point***

```
double y; cin >> y;
double xi;
for(xi=1; ;  xi = (xi + y/xi)/2){
  if(abs(xi*xi – y) > 0.001) break;
}
cout << xi << endl;
```

- Equivalent
- Not Equivalent

No, the answer is incorrect.
Score: 0
Accepted Answers:
Not Equivalent

8) Suppose the element y being searched is not in the array 'A' of length n, but y is larger than x and smaller than z where x,z are at consecutive index positions in the array. Then the value of "A[Bsearch(A,0,n,y)]" will be ***1 point***

- z
- y
- x
- not possible to predict from the given information

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

9) Suppose the element x being searched is present in the array 'A' of length n (only) at indices i through j, i.e. A[i]=x, A[i+1]=x, ... A[j]=x. What will be the value returned by "Bsearch(A,0,n,x)"? ***1 point***

- i-1
- i
- j
- j+1

No, the answer is incorrect.
Score: 0

Accepted Answers:
j

10) I would like to find x such that x>0 and sin(x)=x/2. I decide to usethe bisection method to find the root of f(x) = x/2 - sin(x). What values will be acceptable choices for xL, xR? ***1 point***
You might recall that sin(pi/6) = 0.5, sin(pi/2) = 1, sin(pi) = 0, and
pi = 3.14 (approx).

- pi/6, pi/2
- pi/2, pi
- -pi/2, pi/2
- This cannot be done using the bisection method.

No, the answer is incorrect.
Score: 0

Accepted Answers:
pi/2, pi

11) I would like to find x such that x>0 and sin(x)=x/2. I decide to use the Newton Raphson method to find the root of f(x) = x/2 - sin(x). I start with x_0 = PI. What will x_1 be?
Write your answer to have exactly 2 decimal places.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 2.09

1 point

Given below is a program to find the least common multiple (LCM) of two numbers A,B by brute force search.

```
main_program{
  int m,n; cin >> m >> n;
  for(int i=blank1; i blank2 blank3; i = i blank4 1){
    if((i % m == 0) && (i % n == 0)){
      cout << i << endl;
      break;
    }
  }
}
```

12) What is blank1? Choose the best possible answer. ***1 point***

- m
- n
- min(m,n)
- max(m,n)
- m*n

No, the answer is incorrect.
Score: 0

Accepted Answers:
max(m,n)

13) What is blank2? ***1 point***

- <
- >
- <=
- >=

No, the answer is incorrect.
Score: 0

Accepted Answers:
<=

14) What is blank3? ***1 point***

- m
- n
- min(m,n)
- max(m,n)
- m*n

No, the answer is incorrect.
Score: 0

Accepted Answers:
*m*n*

15) What is blank4? ***1 point***

- +
- -
- *
- /

No, the answer is incorrect.
Score: 0

Accepted Answers:
+

16) Suppose in the bargaining problem as discussed in the lecture, the price that the seller desires is Rs 1000. If the buyer offers Rs. 800, what should the counter offer of the seller be, assuming the rule that the average of the buyer's and sellers offers should be the
desired price?

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 1200

1 point

17) A tank has capacity 20 litres and initially contains 10 litres. As discussed in the lecture, if more water is poured into it than what can be accommodated the excess flows away and is wasted. Likewise if more is demanded than what is in the tank, only what is in the tank can be given. First 15 litres of water are poured. Then 15 litres are asked to be given. Then 5 litres are poured. Then 12 litres are demanded. How much water remains in the tank at the end?

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 0

1 point

18) Suppose I want to read in a 1000 digit number and print the result when 1 is added to it. Only using what is covered in the course so far, which of the following is true? You may assume that the digits are separated by spaces ***1 point***

- It cannot be done.
- It can be done if the digits are given least significant to most significant and need to be printed in the same order.
- It can be done if the digits are given most significant to least significant and need to be printed in the same order.
- It can be done if the digits are given in any order and need to be printed in the same order.

No, the answer is incorrect.
Score: 0

Accepted Answers:
It can be done if the digits are given least significant to most significant and need to be printed in the same order.