Exam

• format
  – multiple choice – 100 points
  – short answer and write-the-code-to-do -- 100 points

• topics
  – basics
    • basic program, variables, constants
  – operators, assignment, basic I/O
  – functions
  – selection (if, else/if )
  – iteration (while, do-while)
Evaluate

```java
int int1 = 0, int2 = 8;
double dbl1 = -15.2, dbl2 = -20.0;
bool flag1 = false, flag2 = true;
a) (int1 <= int2) || !(dbl2 == dbl1)
   true
b) !(flag1) || !(flag2)
   true
c) !(flag1 && flag2)
   true
d) ((dbl1 - dbl2) < 100 / int2) &&
    ((int1 < 1) && !!(flag2))
   false
e) !((int2 - 16 / 2) == int1) && flag1
   false
```
Conditionals

- Test if \( a \) is greater than the values of \( b \) and \( c \) combined.
  - \( a > b + c \)
- Test is any of the 3 variables \( a \), \( b \), or \( c \) are negative
  - \(( a < 0 || b < 0 || c < 0)\)
- Test if all 3 of the variables are positive
  - \((a > 0 && b > 0 && c > 0)\)
- Test if \( a \) has the maximum value of the three variables
  - \((a > b && a > c)\)
- Test if all 3 variables have the same value
  - \((a == b == c) \) or \((a == b && b == c)\)
What prints?

```c
void sub1 (int a);
int main()
{
    int a;
    a = 10;
    cout << a << endl;
    sub1(a);
    cout << a << endl;
    return 0;
}

void sub1 (int a)
{
    a = 20;
    cout << a << endl;
}
```

10 20 10
Indicate which of the following are valid function declarations/prototypes. Explain what is wrong with those that are invalid

a) round_tenth (double x);
b) double make_change (x, y);
c) int max (int x, int y, int z);
d) char sign (double x);
Given the prototype, what are legal calls

int calc(int a, int b);

A) cout << calc(2,3);

B) int x = 1, y = -7;
   cout << calc(x,y);

C) calc(1,2);

D) int z = calc(5,24) * 5 / 2.1;
Given the prototype, what are legal calls

```c++
void calc(int a, int b);

A) cout << calc(2,3);

B) y = calc(5,7) * 5;

C) calc(1,2);
```
Find all errors in each of the following functions

```c
int average (int n1, int n2);
{
    return n1 + n2 / 2;
}
```
Find all errors in each of the following functions

```c
int total (int n1, int n2) {
    int sum;
    return 0;
    sum = n1 + n2;
}
```
What prints?

doSomething();  // code in main
doSomething();

void doSomething()
{
    cout << "Hi ";
    cout << "Bye"<<endl;
}

• Hi Bye
• Hi Bye
What prints?

cout << myFunction (7, 5, 2);  // code in main

int myFunction (int a, int b, int c)
{
    int p = a + 2 * b + c;
    return (p + 3);
}

22
What prints?

```cpp
int calc (int x, int y)
{
    x = x + 1;
    return (x % y);
}
```

• 0
Given int a = 10, b = 5

what does each of the following print

```cpp
if (a <= b) {
    b = a;
    cout << a << endl << b << endl;
}

nothing prints
```

```cpp
if (a <= b) {
    b = a;
    cout << a << endl << b << endl;
}
```

10
5
Given int $a = 10$, $b = 5$

what does each of the following print

temp = 3;
if (a < b)
    temp = a;
a = b;
b = temp;
cout << a << endl << b << endl;

5
3
Given int a = 10, b = 5
what does each of the following print

```cpp
if ((a < b) || (b-a < 0)) {
    a = a + b;
    b = a - 1;
    cout << a << endl << b << endl;
}
```

15
14
Given int \(a = 10\), \(b = 5\) what does each of the following print

\[
a = 7; \\
\text{if } (a = 10) \quad \text{cout} \ll a \ll \text{endl;} \\
10
\]

\[
x = 7; \\
x = x + 1; \\
\text{cout} \ll x \ll \text{endl;} \\
8
\]
what does the following print

```cpp
int a = 5;
int b = 90;
b = b / a - 5;
if (b > a)
    b = a * 30;
cout << a << endl << b << endl;

5
150
```
what prints?

double x = 381.5;
if (x >= 0.0)
    if (x < 1000.00) {
        y = 2 * x;
        if (x <= 500)
            x = x / 10;
    } else
        y = 3 * x;
else
    y = abs(x);
    cout << x << "  " << y << endl;
38.15  763
double x = 600;
if (x >= 0.0)
    if (x < 1000.00) {
        y = 2 * x;
        if (x <= 500)
            x = x / 10;
    } else
        y = 3 * x;
else
    y = abs(x);
cout << x << "   " << y << endl;
• 600       1200
double x = 600;
if (x >= 0.0)
    if (x < 1000.00) {
        y = 2 * x;
        if (x <= 500)
            x = x / 10;
    } else
        y = 3 * x;
else
    y = abs(x);
cout << x << " " << y << endl;
Assume a variable declaration section is

```cpp
int num1, num2;
float num3;
char ch;
```

and you wish to enter the data

15 65.3 -20

Also indicate what values are assigned to appropriate variables.

a) `cin >> num1 >> num3 >> num2;`
b) `cin >> num1 >> num2 >> num3;`
c) `cin >> num1 >> num2 >> ch >> num3;`
d) `cin >> num2 >> num3 >> ch >> num2;`
e) `cin >> num2 >> num3 >> ch >> ch >> num2;`
int k = 3;
while (k <= 8) {
    cout << '*' << endl;
    k++;
}
* * * * * *
j = 1;
while (j <= 5) {
    cout << j << "    " << 5-j << endl;
    j++;
}
1 4
2 3
3 2
4 1
5 0
int a = 1;
while ( 17 % a < 5) {
    cout << a << " " << 17 % a << endl;
    a = a + 1;
}

1 0
2 1
3 2
4 1
5 2
count = 0;
sum = 0;
while (count < 5) {
    count = count + 1;
    sum = sum + count;
    cout << "partial sum is: " << sum << endl;
}
cout << "count is: " << count << endl;
partial sum is: 1
partial sum is: 3
partial sum is: 6
partial sum is: 10
partial sum is: 15
count is: 5
Indicate which of the following are infinite loops

j = 1;
while (j < 10)
    cout << j;
    j = j + 1;

a = 2;
while (a < 20)
{
    cout << a << endl;
    a = a * 2;
}
Indicate which of the following are infinite loops

```cpp
b = 15;
while ( b / 3 == 5) {
    cout << b << b / 5 << endl;
    b = b - 1;
}
```
a = 0;
b = 10;
do {
    a = a + 1;
b = b - 1;
cout << a << " " << b << endl;
} while (a <= b);
1 9
2 8
3 7
4 6
5 5
6 4
int power = 1;
do {
    power = power * 2;
    cout << power << endl;
} while (power <= 30);

2
4
8
16
32
which ones are infinite?

```cpp
j = 1;
do {
    cout << j << endl;
} while (j <= 10);
j = j + 1;

a = 2;
do {
    cout << a << endl;
    a = a * 2;
} while (a <= 20);
```
a = 2;
do {
    cout << a << endl;
    a = a * 2;
} while (a != 20);
int k = 1;
while (k <= 20) {
    if (k % 5 == 0)
        cout << k << endl;
    k = k + 1;
}

5
10
15
20
int j = 20;
if (j%5==0) {
    int k = 1;
    while (k <= 50) {
        cout << k << endl;
        k = k + 1;
    }
}
1   6
2   7
3   8
4   9
5  10
int a = 5;
int b = 90;
do {
    b = b /a-5;
    if ( b > a)
        b = a + 30;
} while (b >= 0);
cout << a << "   " << b << endl;

5   -5
Mr. Thomas has negotiated a salary schedule for his new job. He will be paid one cent ($0.01) the first day, with the daily rate doubling each day. Write a program that will find his total earnings for 30 days. Print is the following form:

<table>
<thead>
<tr>
<th>Day Number</th>
<th>Daily Salary</th>
<th>Total Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>2</td>
<td>.02</td>
<td>.03</td>
</tr>
</tbody>
</table>
write the code needed to calculate the “Insertion Fee” for listing an item in eBay

<table>
<thead>
<tr>
<th>Starting or Reserve Price</th>
<th>Insertion Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.01 - $0.99</td>
<td>$0.20</td>
</tr>
<tr>
<td>$1.00 - $9.99</td>
<td>$0.40</td>
</tr>
<tr>
<td>$10.00 - $24.99</td>
<td>$0.60</td>
</tr>
<tr>
<td>$25.00 - $49.99</td>
<td>$1.20</td>
</tr>
<tr>
<td>$50.00 - $199.99</td>
<td>$2.40</td>
</tr>
<tr>
<td>$200.00 - $499.99</td>
<td>$3.60</td>
</tr>
<tr>
<td>$500.00 or more</td>
<td>$4.80</td>
</tr>
</tbody>
</table>
Approx of PI

• $\pi/4 = 1 - 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + \ldots$

• Evaluate the first 200 terms of this formula and print its approximation of $\pi$