Directions:

a. DO NOT OPEN YOUR EXAM BOOKLET UNTIL YOU HAVE BEEN TOLD TO BEGIN.

b. This exam booklet contains 40 questions, each of which will be weighted equally. The exam is worth 200 points (20% of your course grade).

c. You may use one 8.5" x 11" note sheet and a paper dictionary during the examination. No calculating devices or other reference materials may be used during the examination.

d. You may not ask questions once the examination has begun.

If there is a structural problem with your exam booklet, such as a missing page or poorly printed page, please bring your exam booklet to the proctor.

If you believe that a question is ambiguous or contains a typographic error, write your interpretation of the question on the same page as the question, then put a note on the cover sheet of your exam booklet.

e. You should choose the single best alternative for each question, even if you believe that a question is ambiguous or contains a typographic error. If a question has more than one correct answer, full credit will be awarded for any correct answer.

f. Please fill in the requested information at the top of this exam booklet.

g. Use a #2 pencil to encode any information on your OMR form (bubble sheet).

h. Please encode the following on the OMR form:

   -- Last name and first initial
   -- MSU PID
   -- Exam form (3 X)

i. Only answers recorded on your OMR form will be counted for credit. Completely erase any responses on the OMR form that you wish to delete.

j. You must turn in this exam booklet and the OMR form when you have completed the exam. When leaving, please be courteous to those still taking the exam.

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*  Exam Key                                                                 *
*                                                                           *
*  01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 *
*   E  C  D  E  B  E  B  D  C  D  A  C  A  B  E  A  B  C  D  E  A  B  C  D *
*                                                                           *
*  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40                          *
*   A  B  A  E  C  B  C  E  B  D  A  B  D  D  C  C                          *
*****************************************************************************
A, B, C, D = 0, 0, 0, 20

while D > 0:
    if D//2*2 == D:
        A += 1
        if D//4*4 == D:
            B += 1
    else:
        C += 1
    D = D-3

print( A )    # Line 1
print( B )    # Line 2
print( C )    # Line 3
print( D )    # Line 4

01. Which of the following statements about the Python code labeled "Line 1" in Figure 1 is correct?
   A) It will display 0 when the program is executed.
   B) It will display 1 when the program is executed.
   C) It will display 2 when the program is executed.
   D) It will display 3 when the program is executed.
   E) None of the above.

02. Which of the following statements about the Python code labeled "Line 2" in Figure 1 is correct?
   A) It will display 0 when the program is executed.
   B) It will display 1 when the program is executed.
   C) It will display 2 when the program is executed.
   D) It will display 3 when the program is executed.
   E) None of the above.

03. Which of the following statements about the Python code labeled "Line 3" in Figure 1 is correct?
   A) It will display 0 when the program is executed.
   B) It will display 1 when the program is executed.
   C) It will display 2 when the program is executed.
   D) It will display 3 when the program is executed.
   E) None of the above.

04. Which of the following statements about the Python code labeled "Line 4" in Figure 1 is correct?
   A) It will display 0 when the program is executed.
   B) It will display 1 when the program is executed.
   C) It will display 2 when the program is executed.
   D) It will display 3 when the program is executed.
   E) None of the above.
A, B, C, D = 0, 0, 0, 0

for N in [2, 1, 4, 7, 9, 8, 3, 0, 6, 5]:
    if N%4 == 1:
        A += 1
        continue
    else:
        B += 1
    if N%3 == 0:
        break
    elif N%3 == 2:
        C += 1
        D += 1
    print( A )    # Line 1
    print( B )    # Line 2
    print( C )    # Line 3
    print( D )    # Line 4

05. Which of the following statements about the Python code labeled "Line 1" in Figure 2 is correct?
   A) It will display 1 when the program is executed.
   B) It will display 2 when the program is executed.
   C) It will display 3 when the program is executed.
   D) It will display 4 when the program is executed.
   E) None of the above.

06. Which of the following statements about the Python code labeled "Line 2" in Figure 2 is correct?
   A) It will display 1 when the program is executed.
   B) It will display 2 when the program is executed.
   C) It will display 3 when the program is executed.
   D) It will display 4 when the program is executed.
   E) None of the above.

07. Which of the following statements about the Python code labeled "Line 3" in Figure 2 is correct?
   A) It will display 1 when the program is executed.
   B) It will display 2 when the program is executed.
   C) It will display 3 when the program is executed.
   D) It will display 4 when the program is executed.
   E) None of the above.

08. Which of the following statements about the Python code labeled "Line 4" in Figure 2 is correct?
   A) It will display 1 when the program is executed.
   B) It will display 2 when the program is executed.
   C) It will display 3 when the program is executed.
   D) It will display 4 when the program is executed.
   E) None of the above.
A = "Lake Ontario"
B = "Lake Michigan"
C = "Lake of the Clouds"

D = B.find( "e" )
E = B.find( "i", 2 )
F = B.count( "a" )
G = B.count( "aeiou" )

print( A<B, B<C )   # Line 1
print( A[-5:-2] )   # Line 2
print( D, E )       # Line 3
print( F, G )       # Line 4

09. What will be displayed by the Python code labeled "Line 1" in Figure 3?
A)  True True
B)  True False
C)  False True
D)  False False
E)  None of the above.

10. What will be displayed by the Python code labeled "Line 2" in Figure 3?
A)  ntar
B)  nta
C)  tari
D)  tar
E)  None of the above.

11. What will be displayed by the Python code labeled "Line 3" in Figure 3?
A)  3 6
B)  3 9
C)  4 7
D)  4 10
E)  None of the above.

12. What will be displayed by the Python code labeled "Line 4" in Figure 3?
A)  1 0
B)  1 5
C)  2 0
D)  2 5
E)  None of the above.
### Figure 4

```python
def F( A, B, C ):
    if B < 2:
        B = 2
    if C > len(A):
        C = len(A)
    for J in range( B, C ):
    return D

L = [9, 8, 7, 6, 5, 4, 3, 2]
R = F( L, 1, 5 )
print( R ) # Line 1
print( L[1], L[2] ) # Line 2
print( L[3], L[4] ) # Line 3
print( L[5], L[6] ) # Line 4
```

13. What will be displayed by the Python code labeled "Line 1" in Figure 4?

A) [8, 5]  
B) [9, 6]  
C) 13  
D) 15  
E) None of the above.

14. What will be displayed by the Python code labeled "Line 2" in Figure 4?

A) 8 7  
B) 8 15  
C) 9 8  
D) 9 17  
E) None of the above.

15. What will be displayed by the Python code labeled "Line 3" in Figure 4?

A) 6 5  
B) 6 11  
C) 7 6  
D) 7 13  
E) None of the above.

16. What will be displayed by the Python code labeled "Line 4" in Figure 4?

A) 4 3  
B) 4 7  
C) 5 4  
D) 5 9  
E) None of the above.
### Figure 5

def F( A, B, C, D ):
    A = sorted(A)
    if len(B) <= 5:
        B.append( D )
    else:
        B = B[1:4]
    if type(C) == str:
        C = C.split("ie")
    return R

W = ["Iosco", "Baraga", "Kalkaska", "Bay"]
X = ["Ionia", "Calhoun", "Lake", "Clare", "Antrim"]
Y = "Berrien"
Z = "Emmet"

R = F( W, X, Y, Z )
print( R )    # Line 1
print( W )    # Line 2
print( X )    # Line 3
print( Y )    # Line 4

17. What will be displayed by the Python code labeled "Line 1" in Figure 5?
   A)  (True, True)
   B)  (True, False)
   C)  (False, True)
   D)  (False, False)
   E)  None of the above.

18. What will be displayed by the Python code labeled "Line 2" in Figure 5?
   A)  [’Bay’, ’Baraga’, ’Iosco’, ’Kalkaska’]
   B)  [’Baraga’, ’Bay’, ’Iosco’, ’Kalkaska’]
   C)  [’Iosco’, ’Baraga’, ’Kalkaska’, ’Bay’]
   D)  [’Kalkaska’, ’Iosco’, ’Bay’, ’Baraga’]
   E)  None of the above.

19. What will be displayed by the Python code labeled "Line 3" in Figure 5?
   A)  [’Calhoun’, ’Lake’, ’Clare’]
   B)  [’Ionia’, ’Calhoun’, ’Lake’]
   C)  [’Ionia’, ’Calhoun’, ’Lake’, ’Clare’, ’Antrim’]
   D)  [’Ionia’, ’Calhoun’, ’Lake’, ’Clare’, ’Antrim’, ’Emmet’]
   E)  None of the above.

20. What will be displayed by the Python code labeled "Line 4" in Figure 5?
   A)  [’Berr’, ’n’]
   B)  [’Berrie’, ’n’]
   C)  [’B’, ’rr’, ’’’, ’n’]
   D)  [’Be’, ’rr’, ’i’, ’e’, ’n’]
   E)  None of the above.
def F( A, B, C, D ):
    A = {}
    for c in "Ontonagon County":
        if c not in A:
            A[c] = 1
        else:
            A[c] += 1

    print( len(A) )     # Line 1
    print( A['t'] )     # Line 2
    print( A['o'] )     # Line 3

    B = []
    for c,d in A.items():
        B.append( (d,c) )
    B.sort( reverse=True )

    print( B[0] )       # Line 4

21. What will be displayed by the Python code labeled "Line 1" in Figure 6?
   A) 10
   B) 11
   C) 15
   D) 16
   E) None of the above.

22. What will be displayed by the Python code labeled "Line 2" in Figure 6?
   A) 1
   B) 2
   C) 3
   D) 4
   E) None of the above.

23. What will be displayed by the Python code labeled "Line 3" in Figure 6?
   A) 1
   B) 2
   C) 3
   D) 4
   E) None of the above.

24. What will be displayed by the Python code labeled "Line 4" in Figure 6?
   A) ‘n’
   B) 4
   C) (‘n’, 4)
   D) (4, ‘n’)
   E) None of the above.
class Distance( object ):
    
    def __init__( self, value, scale="km" ):
        self.__value = 0
        self.__scale = "km"
        if isinstance( scale, str ) and scale == "km":
            if isinstance( value, (float,int) ):
                self.__value = value
                self.__scale = "km"

    def __str__( self ):
        return "{} {}\n".format( self.__value, self.__scale )
    
    def miles( self ):
        return "{} {}\n".format( self.__value+0.621371, "miles" )
    
    def magnitude( self ):
        return self.__value

    def __gt__( self, other ):
        if type( other ) != Distance:
            raise TypeError
        else:
            return self.__value > other.__value

    def __ne__( self, other ):
        # pass

    def __add__( self, other ):
        if isinstance( other, (float,int) ):
            return Distance( self.__value+other, "km" )
        else:
            return Distance( self.__value, "km" )

    def __radd__( self, other ):
        # pass

def main():
    X = Distance( 2.5, "km" )
    Y = Distance( 3.7, "km" )
    
    # REPLACE

main()
Questions 25 through 30 refer to the Python code in Figure 7 (previous page).

25. Which of the following statements will generate an exception when it is substituted for the comment "REPLACE" in function "main" in Figure 7?

   A)  A = Distance()
   B)  B = Distance( 9.9 )
   C)  C = Distance( 25, "km" )
   D)  All of the above.
   E)  None of the above.

26. Which of the following statements will generate an exception when it is substituted for the comment "REPLACE" in function "main" in Figure 7?

   A)  print( X )
   B)  print( miles(X) )
   C)  print( str(X) )
   D)  All of the above.
   E)  None of the above.

27. Which of the following statements will generate an exception when it is substituted for the comment "REPLACE" in function "main" in Figure 7?

   A)  A = X > 9
   B)  B = X < Y
   C)  C = X > Y
   D)  All of the above.
   E)  None of the above.

28. Which of the following statements will generate an exception when it is substituted for the comment "REPLACE" in function "main" in Figure 7?

   A)  A = X + Y
   B)  B = X + 2
   C)  C = 3 + Y
   D)  All of the above.
   E)  None of the above.

29. Which of the following is a correct replacement for the "pass" statement in method "__ne__" in Figure 7?

   A)  return not not self < other and other < self
   B)  return other.__ne__( self )
   C)  return self > other or other > self
   D)  All of the above.
   E)  None of the above.

30. Which of the following is a correct replacement for the "pass" statement in method "__radd__" in Figure 7?

   A)  return return other + self
   B)  return self.__add__( other )
   C)  return (self.__value + other.__value, "km" )
   D)  All of the above.
   E)  None of the above.
class Thing( object ):
    def __init__( self, value ):
        self.value = value
    def __str__( self ):
        return str( self.value )
    def add( self, n ):
        self.value = self.value + n
    def mul( self, n ):
        self.value = self.value * n

class Gadget( Thing ):
    def add( self, n ):
        self.value = self.value + (2*n)
    def sub( self, n ):
        self.value = self.value - (2*n)
        Thing.mul( self, n )
    def mul( self, n ):
        self.value = self.value * (2*n)

class Gizmo( Thing ):
    def add( self, n ):
        Thing.mul( self, n )
        self.value = self.value + (4*n)

A = Gadget( 10 )
A.add( 2 )      # Line 1
print( A )      # Line 2
B = Gadget( 10 )
B.sub( 3 )      # Line 3
print( B )      # Line 4
C = Gizmo( 20 )
C.mul( 4 )      # Line 5
print( C )      # Line 6
D = Gizmo( 20 )
D.add( 5 )      # Line 7
print( D )      # Line 8
E = Gizmo( 30 )
E.sub( 6 )      # Line 9
print( E )      # Line 10
Questions 31 through 35 refer to the Python code in Figure 8 (previous page).

31. Which of the following statements is correct?
   A) Line 1 is not valid.
   B) Line 2 will display 12 when it is executed.
   C) Line 2 will display 14 when it is executed.
   D) Line 2 will display 28 when it is executed.
   E) None of the above.

32. Which of the following statements is correct?
   A) Line 3 is not valid.
   B) Line 4 will display 4 when it is executed.
   C) Line 4 will display 14 when it is executed.
   D) Line 4 will display 24 when it is executed.
   E) None of the above.

33. Which of the following statements is correct?
   A) Line 5 is not valid.
   B) Line 6 will display 80 when it is executed.
   C) Line 6 will display 160 when it is executed.
   D) Line 6 will display 240 when it is executed.
   E) None of the above.

34. Which of the following statements is correct?
   A) Line 7 is not valid.
   B) Line 8 will display 25 when it is executed.
   C) Line 8 will display 30 when it is executed.
   D) Line 8 will display 120 when it is executed.
   E) None of the above.

35. Which of the following statements is correct?
   A) Line 9 is not valid.
   B) Line 10 will display 18 when it is executed.
   C) Line 10 will display 108 when it is executed.
   D) Line 10 will display 168 when it is executed.
   E) None of the above.
def task1( A, B ):
    try:
        return int(A) * int(B)
    except ZeroDivisionError:
        return 1

def task2( A, B ):
    try:
        return int(A) // int(B)
    except ValueError:
        return 2

def work( A, B ):
    P, Q = 0, 0
    try:
        if str(A) < str(B):
            P = task1( A, B )
            Q += 1
        else:
            P = task2( A, B )
            Q += 2
    except ZeroDivisionError:
        P += 2
        Q += 4
    except:
        P += 4
        Q += 8
    else:
        P += 8
        Q += 16
    finally:
        P += 16
        Q += 32
    return (P, Q)

print( work( 2, 0 ) )  # Line 1
print( work( 3, 5 ) )  # Line 2
print( work( 5, 1.25 ) )  # Line 3
print( work( "W", "X" ) )  # Line 4
print( work( 0, 6 ) )  # Line 5
Questions 36 through 40 refer to the Python code in Figure 9 (previous page).

36. Which of the following statements about the Python code labeled "Line 1" in Figure 9 is correct?
   A) It will display (17, 34) when the program is executed.
   B) It will display (18, 36) when the program is executed.
   C) It will display (19, 38) when the program is executed.
   D) It will display (24, 49) when the program is executed.
   E) None of the above.

37. Which of the following statements about the Python code labeled "Line 2" in Figure 9 is correct?
   A) It will display (8, 17) when the program is executed.
   B) It will display (23, 17) when the program is executed.
   C) It will display (24, 33) when the program is executed.
   D) It will display (39, 49) when the program is executed.
   E) None of the above.

38. Which of the following statements about the Python code labeled "Line 3" in Figure 9 is correct?
   A) It will display (12, 18) when the program is executed.
   B) It will display (13, 18) when the program is executed.
   C) It will display (28, 50) when the program is executed.
   D) It will display (29, 50) when the program is executed.
   E) None of the above.

39. Which of the following statements about the Python code labeled "Line 4" in Figure 9 is correct?
   A) It will display (9, 16) when the program is executed.
   B) It will display (10, 18) when the program is executed.
   C) It will display (20, 40) when the program is executed.
   D) It will display (25, 49) when the program is executed.
   E) None of the above.

40. Which of the following statements about the Python code labeled "Line 5" in Figure 9 is correct?
   A) It will display (8, 17) when the program is executed.
   B) It will display (8, 18) when the program is executed.
   C) It will display (24, 49) when the program is executed.
   D) It will display (24, 50) when the program is executed.
   E) None of the above.