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 the OMR form.

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                                                                 *
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*  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  A  B  E  C  B  C  E  A  A  B  A  B  B  B  D  B  D  B  D  C  E  *
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*  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40                          *
*   E  A  E  C  A  B  C  C  E  C  D  A  D  C  D  B                           *
******************************************************************************
A, B, C, D = 0, 0, 0, 0

for A in [ 4, 5, 7, 4, 9, 2, 1 ]:
    if A > 3:
        if A//2*2 == A:
            B += 1
        else:
            C += 1
    if A%3 == 0:
        break
    D += 1

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

A = 21
while A > 1:
    B += 1
    if A%3 == 2:
        C += 1
    elif A%3:
        D+= 1
    A = A - 4

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 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.

06. Which of the following statements about the Python code labeled "Line 2" in Figure 2 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.

07. Which of the following statements about the Python code labeled "Line 3" in Figure 2 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.

08. Which of the following statements about the Python code labeled "Line 4" in Figure 2 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 = "Well, that’s no ordinary rabbit."
B = "What is your quest?"
C = "What is your favorite color?"
D = A > B
E = B > C

```
print( D, E )          # Line 1
print( A[9], A[-3] )   # Line 2
print( B[-4:] )        # Line 3
print( C[9:11] )       # 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) a i
    B) t b
    C) Well, tha it.
    D) Well, that bit.
    E) None of the above.

11. What will be displayed by the Python code labeled "Line 3" in Figure 3?
    A) est?
    B) est?
    C) What is your qu
    D) What is your q
    E) None of the above.

12. What will be displayed by the Python code labeled "Line 4" in Figure 3?
    A) ou
    B) our
    C) yo
    D) you
    E) None of the above.
```python
def fun( L, M, N=4 ):
    L[1] = "Galahad"
    if len(L) > N:
        L = L[:N]
        L[N-1] = M
    return L[-1]

A = "Sir Launcelot the Brave"
B = "Trustworthy and"
A = A.split()
B = B + fun( A, "Bold", 5 )

print( A )    # Line 1
print( B )    # Line 2

C = "Sir Robin of the Round Table"
D = "Castle"
C = C.split()
D = D + fun( C, "Camelot" )

print( C )    # Line 3
print( D )    # Line 4
```

13. What will be displayed by the Python code labeled "Line 1" in Figure 4?
   A) ['Sir', 'Launcelot', 'the', 'Brave']
   B) ['Sir', 'Galahad', 'the', 'Brave']
   C) ['Sir', 'Launcelot', 'the', 'Bold']
   D) ['Sir', 'Galahad', 'the', 'Bold']
   E) None of the above.

14. What will be displayed by the Python code labeled "Line 2" in Figure 4?
   A) Trustworthy and Brave
   B) Trustworthy and Bold
   C) Brave
   D) Bold
   E) None of the above.

15. What will be displayed by the Python code labeled "Line 3" in Figure 4?
   A) ['Sir', 'Robin', 'of', 'the', 'Round', 'Table']
   B) ['Sir', 'Galahad', 'of', 'the', 'Round', 'Table']
   C) ['Sir', 'Robin', 'of', 'Camelot']
   D) ['Sir', 'Galahad', 'of', 'Camelot']
   E) None of the above.

16. What will be displayed by the Python code labeled "Line 4" in Figure 4?
   A) Castle Table
   B) Castle Camelot
   C) Table
   D) Camelot
   E) None of the above.
L = []  
M = {}  
for c in "Tim the Enchanter".lower():  
    if c in "aeiou":  
        L.append( c )  
    if c not in M:  
        M[c] = 0  
    M[c] += 1

print( len(L), len(M) )  # Line 1
print( M[‘a’], M[‘e’] )  # Line 2

S, T = set(), set()  
for c in "Arthur".upper():  
    S.add( c )

for c in "Galahad".upper():  
    T.add( c )

print( len(S), len(T) )  # Line 3
Z = sorted( list( S|T ) )
print( Z )  # Line 4

17. What will be displayed by the Python code labeled "Line 1" in Figure 5?
   A)  4 3
   B)  5 3
   C)  5 4
   D)  17 17
   E)  None of the above.

18. What will be displayed by the Python code labeled "Line 2" in Figure 5?
   A)  ‘a’: 1 ‘e’: 2
   B)  ‘a’: 1 ‘e’: 3
   C)  1 2
   D)  1 3
   E)  None of the above.

19. What will be displayed by the Python code labeled "Line 3" in Figure 5?
   A)  1 1
   B)  5 5
   C)  5 6
   D)  6 7
   E)  None of the above.

20. What will be displayed by the Python code labeled "Line 4" in Figure 5?
   A)  [’A’, ’H’]
   B)  [’R’, ’T’, ’U’]
   E)  None of the above.
S = "Who are you who are so wise in the ways of science?"
L = S.strip().split()
M = dict()

for I in range(len(L)):
    M[L[I]] = I

print(M["you"])  # Line 1
print(M["are"])  # Line 2
print(M["who"])  # Line 3
print(M["science"])  # Line 4

21. Which of the following statements about the Python code labeled "Line 1" in Figure 6 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.

22. Which of the following statements about the Python code labeled "Line 2" in Figure 6 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.

23. Which of the following statements about the Python code labeled "Line 3" in Figure 6 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.

24. Which of the following statements about the Python code labeled "Line 4" in Figure 6 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.
class Fraction( object ):

    def __init__( self, numer=0, denom=1 ):
        self.__numer = 0
        self.__denom = 1
        if type( numer ) == int and type( denom ) == int:
            self.__numer = numer
            self.__denom = denom
            self.__reduce()

    def __str__( self ):
        return str( self.__numer ) + "/" + str( self.__denom )

    def values( self ):
        return (self.__numer, self.__denom)

    def __add__( self, other ):
        if type( other ) != Fraction:
            other = Fraction( other )
        top = (self.__numer * other.__denom) + (self.__denom * other.__numer)
        bottom = self.__denom * other.__denom
        return Fraction( top, bottom )

    def __radd__( self, other ):
        pass

    def __lt__( self, other ):
        top1 = self.__numer * other.__denom
        top2 = other.__numer * self.__denom
        return top1 < top2

    def __eq__( self, other ):
        pass
def __reduce__( self ):
    a, b = self.__numer, self.__denom
    if not a > b:
        a, b = b, a
    while b!=0:
        rem = a%b
        a, b = b, rem
    self.__numer = self.__numer // a
    self.__denom = self.__denom // a
    if (self.__numer < 0 and self.__denom < 0) |
    or (self.__numer > 0 and self.__denom < 0):
        self.__numer = -self.__numer
        self.__denom = -self.__denom

###########################################################################
## Figure 7 -- Program
###########################################################################

def main():
    X = Fraction( 4, 8 )
    Y = Fraction( 1, 3 )
    # 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 = Fraction()
   B)  B = Fraction( 3.5 )
   C)  C = Fraction( "1/3" )
   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.__numer, X.__denom )
   B)  print( str( X ) )
   C)  print( X.values() )
   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 + Y
   B)  B = X + 5
   C)  C = 5 + X
   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 > Y
   C)  C = X < 5
   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 "__radd__" in Figure 7?

   A)  return self + other
   B)  return (self.__numer + other.__numer, self.__denom + other.__denom)
   C)  return other.__add__( 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 "__eq__" in Figure 7?

   A)  return self == other
   B)  return not (self < other or self > other)
   C)  return other.__eq__( self )
   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 sub( self, n ):
        self.value = self.value - n
    def mul( self, n ):
        self.value = self.value * n

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

class Gizmo( Gadget ):
    def add( self, n ):
        self.value = self.value + (4*n)
    def sub( self, n ):
        self.value = self.value - (4*n)
        Gadget.mul( self, n )
    def div( self, n ):
        self.value = self.value / (4*n)
A = Gadget( 20 )
A.add( 2 )        # Line 1
print( A )        # Line 2

B = Gadget( 20 )
B.sub( 3 )        # Line 3
print( B )        # Line 4

C = Gizmo( 30 )
C.add( 4 )        # Line 5
print( C )        # Line 6

D = Gizmo( 30 )
D.mul( 5 )        # Line 7
print( D )        # Line 8

E = Thing( 40 )
E.sub( 6 )        # Line 9
print( E )        # Line 10

F = Thing( 40 )
F.div( 8 )        # Line 11
print( F )        # Line 12
Questions 31 through 36 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 24 when it is executed.
C) Line 2 will display 44 when it is executed.
D) Line 2 will display 48 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 11 when it is executed.
C) Line 4 will display 14 when it is executed.
D) Line 4 will display 48 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 64 when it is executed.
C) Line 6 will display 120 when it is executed.
D) Line 6 will display 128 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 150 when it is executed.
C) Line 8 will display 300 when it is executed.
D) Line 8 will display 600 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 16 when it is executed.
C) Line 10 will display 28 when it is executed.
D) Line 10 will display 34 when it is executed.
E) None of the above.

36. Which of the following statements is correct?

A) Line 11 is not valid.
B) Line 12 will display 0.8 when it is executed.
C) Line 12 will display 1 when it is executed.
D) Line 12 will display 1.25 when it is executed.
E) None of the above.
def calc( X, Y ):
    try:
        return X % Y
    except TypeError:
        return 5

def process( A=0, B=0 ):
    V, Z = (0, 0)
    try:
        Z = calc( int(A), B )
    except ValueError:
        V += 16
    except ZeroDivisionError:
        V += 8
    except:
        V += 4
    else:
        V += 2
    finally:
        V += 1
    return (V, Z)

def main():
    print( process( 4.75 ) )  # Line 1
    print( process( 10.5, 3 ) )  # Line 2
    print( process( "one", 4 ) )  # Line 3
    print( process( 8, "two" ) )  # Line 4
main()
Questions 37 through 40 refer to the Python code in Figure 9 (previous page).

37. Which of the following statements about the Python code labeled "Line 1" in Figure 9 is correct?

   A) It will display (1, 5) when the program is executed.
   B) It will display (2, 0) when the program is executed.
   C) It will display (3, 1) when the program is executed.
   D) It will display (9, 0) when the program is executed.
   E) None of the above.

38. Which of the following statements about the Python code labeled "Line 2" in Figure 9 is correct?

   A) It will display (1, 1) when the program is executed.
   B) It will display (2, 2) when the program is executed.
   C) It will display (3, 1) when the program is executed.
   D) It will display (3, 2) when the program is executed.
   E) None of the above.

39. Which of the following statements about the Python code labeled "Line 3" in Figure 9 is correct?

   A) It will display (4, 0) when the program is executed.
   B) It will display (5, 0) when the program is executed.
   C) It will display (16, 0) when the program is executed.
   D) It will display (17, 0) when the program is executed.
   E) None of the above.

40. Which of the following statements about the Python code labeled "Line 4" in Figure 9 is correct?

   A) It will display (1, 5) when the program is executed.
   B) It will display (3, 5) when the program is executed.
   C) It will display (16, 0) when the program is executed.
   D) It will display (17, 0) when the program is executed.
   E) None of the above.