

WASHINGTON STATE MIDDLE SCHOOL COMPUTER SCIENCE COMPETITION

May 30, 2015

Individual Challenge Grades 5-6 30 Minutes

Please read these directions carefully before beginning. Breaking any of the rules is grounds for disqualification.

- Do not turn this page and begin working the test until the start of the test is announced. Once time starts, you will have 30 minutes to complete this test.
- There is no talking allowed at any time. If you have a question about the test, please raise your hand.
- If you put a smiley face next to your answer for question 14, you get bonus points!
- No electronic devices of any kind (calculators, phones, computers, etc.) are allowed during the test.
- Write all of your answers on the answer sheet provided. Write as clearly as possible. If we can't read your answers, you will not receive points.
- Questions within each section are increasing in difficulty, and harder questions are worth more points.
- For all Scratch questions, assume that the script shown is the **only** script in the game.
- Do not feel bad if you don't finish the test it is designed to be too long to finish in 30 minutes!

Scratch Questions

1. 1 point What happens when the green flag is clicked?



2. 1 point After this code executes, in what direction is the sprite pointing?



- 3. 2 points How does the sprite with this code behave when the green flag is clicked?
 - A. Spins forever
 - B. Turns 90 degrees to the right every second
 - C. Turns so fast you can't see it
 - D. Turns left and then right over and over again



- 4. 2 points How does the sprite with this code behave when clicked? Assume this is the only script.
 - A. Rings
 - B. If touching red, rings
 - C. Whenever touching red, rings
 - D. Touches red if ringing



- 5. 2 points Will the following expressions evaluate to **TRUE** or **FALSE**?
 - A. Both true
 - B. The left is true, right is false
 - C. The right is true, left is false
 - D. Both false



- 6. 2 points What happens when the green flag is clicked?
 - A. A baseball is hit
 - B. The sprite hides
 - C. Nothing

when 🦰 clicked	when I receive baseball hit 🔻
broadcast baseball hit	hide

7. 3 points After the following code executes, is the backdrop equal to \mathbf{a} or \mathbf{z} ?



8. 4 points How many seconds will the code below take to execute after the green flag is clicked?



9. 5 points What do Width and Height equal after this code executes?



10. 5 points How many clones exist 3.5 seconds after the green flag is clicked?



Pseudocode Questions

11. 1 point What will happen if Jackie pulls the lever?

```
when Jackie pulls lever:
machine turn on
when Jane pulls lever:
machine self destruct
```

12. Read the following code and then answer the next 3 questions.

```
if George walks through garden AND arboretum:
    collect 3 flowers
else if George walks through garden OR arboretum:
    collect 1 flower
```

- (a) 1 point George walks through the arboretum and the garden. How many flowers does he collect?
- (b) 1 point George walks through the forest. How many flowers does he collect?
- (c) 1 point George walks through the forest and the garden. How many flowers does he collect?

```
13. 2 points If X = 5, what does the following code print?
      if X > 5:
           print "yes"
      otherwise, if X = 5:
           print "maybe"
      otherwise:
           print "no way"
14. 3 points What does MYSTERY (5.5567) produce?
     x = 3
     y = 4.12945
     z = 100.00000
     MYSTERY(x) ---> 3.00
     MYSTERY(y) ---> 4.12
     MYSTERY(z) ---> 100.00
15. 3 points What does MyFun(''find the pattern'') produce?
      s1 = "hello"
      s2 = "aeiou and sometimes y"
      s3 = "lv1 = 5"
      MyFun(s1) ---> "hXllX"
      MyFun(s2) ---> "XXXXX Xnd sXmXtXmXs X"
      MyFun(s3) ---> "lvl = 5"
16. 2 points Below is the pseudocode for MyFun. Which line contains an error?
     1
          for every letter in phrase:
     2
                if that letter is not a, e, i, o, u, or y:
     3
                     replace that letter with X
17. 2 points
              What does MNM equal after the code below is executed?
     MNM is set to 1
     repeat 3 times:
          multiply MNM by 3
          add 1 to MNM
18. 3 points What do j and k equal after the code below is executed?
      j is set to 4
      k is set to j
      j is multiplied by 2
      k is set to (j + k)
      k is multiplied by 2
      j is set to (j - k)
```

19. A **tree** is a data structure. Below is a family tree, which models people and their relationships:



To access a person in the tree, you must start from the top (the "root" of the tree) and work your way down by moving to the left or right (following the left "branch" or right "branch.") Examples:

- This expression accesses Denise: tree.left.value
- This expression accesses Dan: tree.left.right.value
- This expression accesses Sue: tree.left.left.value
- (a) 4 points Write the expression to access Ramona.
- (b) 1 point Write the expression to access Margaret.

Logic Questions

20. Answer the following questions by looking at the Venn diagram.



- (a) Is Max short?
- (b) Does Max have green eyes?
- 21. 1 point Ella loves the Sounders.Everyone who loves the Sounders wears green on game days.Today is a game day.What color is Ella wearing?

- 22. 1 point Michael always eats cereal for breakfast. Michael always eats macaroni for lunch. Jess always eats what Michael eats. Its lunch time! What is Jess eating?
- 23. 2 points Hanz is a pianist.
 The symphony orchestra only hires people who are either pianists or classically trained. Hanz is not classically trained. Could the symphony hire Hanz?
- 24. 2 points Sally is a great white shark. Mark is sneaky.All great white sharks swim in the ocean. Only great white sharks are sneaky. Who swims in the ocean?
 - A. Sally
 - B. Mark
 - C. Both
 - D. Neither
- 25. 3 points A pencil and an eraser together cost \$1.10. The pencil costs \$1.00 more than the eraser. How much does the eraser cost?
- 26. 4 points Jordan, Sana, Ritu, and Victor are sitting side by side at a restaurant. Jordan will not sit next to Sana, Victor refuses to sit to the right of Ritu, Ritu will not sit on either end of the row, and Sana wants to sit by Victor. Which of the following seating arrangements makes everyone happy?
 - A. Jordan, Sana, Ritu, Victor
 - B. Jordan, Ritu, Sana, Victor
 - C. Sana, Victor, Jordan, Ritu
 - D. Sana, Victor, Ritu, Jordan
- 27. 3 points What is F(1,2,3)?

fa(in) = in divided by 2
fb(in) = in times 3
F(a, b, c) = c plus fa(b) minus fb(a)

28. 5 points Ritu and Victor are on vacation in Europe.



- (a) 5 points They are trying to visit every city on their map at least once, but travel the least distance possible. What route should they take? Write down the first letter of each city, in order. Start with Paris (P).
- (b) 5 points Which city could Ritu and Victor eliminate from their vacation to save the most distance traveled?