

Post-16 Transition Support

A Level Computer Science

Transition Project

In preparation for your course, you should consider completing the following tasks so that you become more familiar with the things you may cover on your Computer Science course, with particular emphasis on programming languages and developing your ability to work independently.

Knowledge Topics – Programming Languages

Task 1:

Using each of the following programming languages write a short program to output both **text** and a **calculation**.

- Visual Basic
- Python
- C#

1. Add screenshots of both the **code** and the **output** for each program
2. Add your conclusions about the **ease** or **difficulty** of each language and their **similarities**
3. Label the **variables** within each of your programs
4. Find examples in **each** of the programming languages of **sequence**, **selection** and **iteration**.

Task 2:

Summarise all of the above onto no more than 2 sides of A4 paper. This can include screenshots, labels and conclusions as described above.

Other key questions you could consider investigating are:

- The need for computer algorithms and pseudocode.
- What is the purpose of exception handling in programs?
- Explain why exception handling routines are useful for validating data input for the user.
- Why is it important to test a solution and the different kinds of testing that can be carried out?
- Algorithms and ethics - what does this mean?

All of these questions will be examined over the next two years. Time spent considering them now would not be wasted. Try to condense your thoughts into an A3 mind map and keep them for your A level course.



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Knowledge Topics – Thinking Abstractly

1. Give examples of some problems which can be tackled by building models or computer simulations
2. What factors would be relevant in a financial model which calculates the likely annual profit in a new coffee shop?

What factors would be irrelevant?

3. Solve this puzzle.

Roll 1



The answer to Roll 1 is: 4

Roll 2



The answer to Roll 2 is: 8

Roll 3



The answer to Roll 3 is: 14

Roll 4



The answer to Roll 4 is: 0

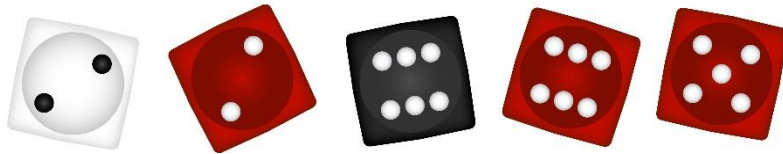
Roll 5



The answer to Roll 5 is: 4

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Roll 6

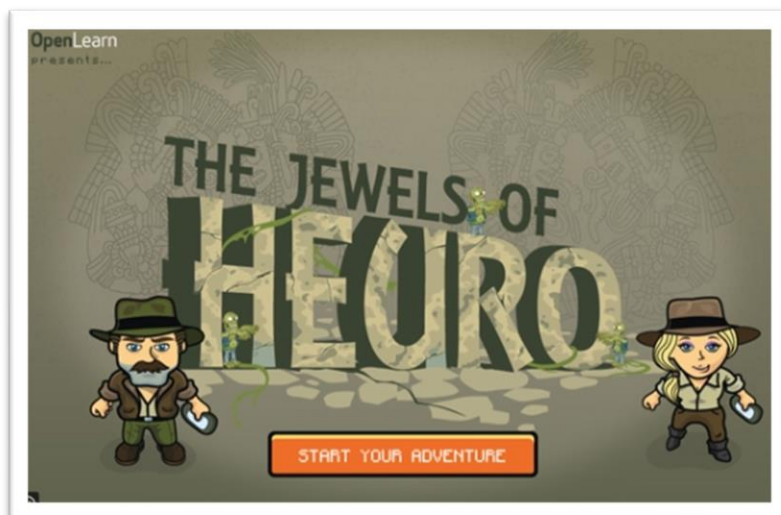


What is the answer to Roll #6?

Why?

Knowledge Topics – Problem Solving

Task 1: The Jewels of Heuro



This game was written by Dr Michel Wermelinger (Faculty of Mathematics, Computing and Technology) as part of the Open Learn project at the Open University.

1. Try the game by following the link

<http://www.open.edu/openlearn/science-maths-technology/computing-and-ict/computing/the-jewels-heuro>

Write down the best route you found in your attempt to find the shortest tour at the end of the game, and the length of the tour.

What strategies did you employ to find the best solution?



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2. Go to <http://www.hbmeyer.de/backtrack/backtren.htm> , which models the performance of a backtracking algorithm. The aim of the algorithm is to find an arrangement of the 9 cards such that each side touches a “matching” card. There is no quick and efficient algorithm to solve this problem.

Tip: Set it to “automatically”. and use a small delay of about 30ms or you will be watching the backtracking algorithm for a long, long time!

Task 2:

1. Look up Google’s Privacy Policy at <https://www.google.com/policies/privacy/>

What data do they collect about you?

What use do you think they make of this data?

2. Go to <http://www.sorting-algorithms.com/> , which models the performance of different sorting algorithms.

Additional challenge task

Navigate to the web page

http://www.mrao.cam.ac.uk/~steve/astrophysics/webpages/barometer_story.htm and read the story.

Were the student’s solutions to the problem **correct**?

Were the solutions **efficient**?