# Computing Technology Stage 5 (Year 10) – sample assessment task 2 notification

**Software development** **– creating games and simulations**



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## Task description

**Type of task**: creating games and simulations project and documentation

**Outcomes being assessed**:

A student:

* selects and applies safe, secure and responsible practices in the ethical use of data and computing technology **CT5-SAF-01**
* applies iterative processes to define problems and plan, design, develop and evaluate computing solutions **CT5-DPM-01**
* manages, documents and explains individual and collaborative work practices **CT5-COL-01**
* communicates ideas, processes and solutions using appropriate media **CT5-COM-01**
* designs, produces and evaluates algorithms and implements them in a general-purpose and/or object-oriented programming language **CT5-OPL-01**
* designs and creates user interfaces and the user experience **CT5-DES-01**

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**Suggested weighting:** 35%

Student will utilise their programming knowledge and skills to create an arcade style game using Python and an appropriate framework (Pygame Zero). Students will work through and demonstrate the producing and implementing stages of developing an arcade-style game by submission of a portfolio and working game.

## Submission details

Students can submit their work digitally including their project code and portfolio.

Students can present their product in class for peer and teacher review.

## Steps to success

Table – assessment preparation schedule

|  |  |
| --- | --- |
| Steps | What I need to do/when I need to do it |
| Create a portfolio | * Create a document that is presented professionally using techniques learnt earlier in the semester and which has a heading for each of the steps listed in this table.
 |
| Produce a Gantt chart | * Create a spreadsheet and implement a Gantt chart to show intended work over the term.
 |
| Identifying and defining | * Identify the need for the game.
* Define the problem and requirements.
* Propose a solution.
 |
| Researching and planning | * Research 2 existing arcade games focusing on game elements that are included in these games that can be implemented into your game.
* Detail the logic for part of your game using either a flowchart or pseudocode.
 |
| Implementing | * Produce an arcade-style game using Python. The game must have a menu, clear objective, score tracker and appropriate screens.
* Produce internal and intrinsic documentation.
 |
| Testing | * Produce evidence, in the form of screenshots, to show that you have checked your product for errors, utilised error correction and are confident that it functions correctly under different circumstances.
 |
| Evaluate your game | * Gather feedback from 3 peers, using the rubric in Assessment task 2, to gather feedback on your game.
* Evaluate your final product and how well you believe it meets the requirements for your product as set out in the identifying and defining section of your portfolio.
 |

## What is the teacher looking for?

The teacher is looking for a game that could be placed into an arcade that is playable and enjoyable.

Some features of an arcade game include:

* ensuring multiple design principles are incorporated into the game design
* allowing for multiple games or attempts, keeping track of the number of games each player has won
* implementing high score tracker
* allowing for the game progress to be saved and then resumed at a later time
* recording the history of moves so that the game may be replayed
* main menu
* multiplayer capabilities
* implementing a basic AI that the player may play against.

The quality of the code will also be considered as well as the presentation of your supporting material documenting the development of the game product.

## Marking guidelines

Table – assessment marking guidelines

|  |  |
| --- | --- |
| Grade | Marking guideline descriptors |
| A | * The student skilfully applies appropriate iterative processes to produce computing solutions.
* The student skilfully develops, tests and implements technically concise algorithms in a general-purpose programming language.
* The student demonstrates creativity and innovation in the design and implementation of user interfaces and features to create engaging user experiences.
* The student selects relevant data, media and processes to effectively communicate information in a range of contexts.
 |
| B | * The student applies appropriate iterative processes to produce computing solutions.
* The student develops, tests and implements functional algorithms in a general-purpose programming language.
* The student demonstrates creativity in the design and implementation of user interfaces and features to create engaging user experiences.
* The student selects relevant data, media and processes to communicate appropriate information in a range of contexts.
 |
| C | * The student applies iterative processes to produce computing solutions.
* The student develops common algorithms and implements them in a general-purpose programming language.
* The student designs and implements user interfaces and features to create user experiences.
* The student selects appropriate data, media and processes to communicate information in a range of contexts.
 |
| D | * The student develops basic algorithms and/or implements them in a general-purpose programming language.
* The student implements basic elements of user interface design to support user experiences.
* The student uses data to communicate basic information.
 |
| E | * The student follows algorithms and/or partially implements them in a general-purpose programming language.
* The student identifies elements of user interfaces that contribute to user experiences.
* The student uses data to communicate information in a very limited way.
 |

## Student-facing rubric

Table – rubric for assessment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Criteria | Limited | Basic | Sound | High | Outstanding |
| Portfolio presentation | There is limited organisation of content and use of word processor features. | The portfolio has some organisation to the content and there is an attempt made to use word processor features. | The portfolio is presented utilising a variety of word processor features and is generally well organised. | The portfolio is presented in a professional manner utilising various word processor features and is well organised. | The portfolio is presented in a highly professional manner, that conveys knowledge effectively, utilising a broad range of word processor features such as styles and footers. |
| Gantt chart | A limited plan has been provided with some elements of a Gantt chart present. | A general plan for the work to be completed has been provided with some record of actual timings for tasks that are performed. | The Gantt chart is sound and has generally logical timings for the work to be completed. Most timings for actual work are documented. | The Gantt chart is clear and neat and presents a thorough plan for the work and an accurate representation of actual timings for work completed. | The Gantt chart is presented in an easy-to-read manner with a methodical plan for the work and an accurate representation of actual work completed. Additional features are implemented to increase the usefulness of the chart. |
| Identify and defining | Some requirements of the game have been identified. | A basic explanation of the requirements of the game is provided. | An outline of the problem and needs of the user is provided. | A thorough discussion of the problem and requirements of the player is provided. | An extensive identification of the problem and the needs of the player is provided. |
| Research and planning | Some existing products have been listed but in a very limited way. An attempt has been made to identify aspects of logic in the game. | A basic listing of relevant existing products with some mention of their game design elements. The logic that is trying to be expressed is evident though there are errors in its presentation. | A sound analysis of relevant existing products, outlining their relevance to the intended game. Generally correct and valid representation of a part of the processing. | Effective research into 2 existing products. Mostly correct and valid representation of a significant feature of the game. | Highly effective research into 2 existing and relevant products with evidence of their game design elements and the possible implementation into the game. Correctly presented and methodical outline of logic for a complicated part of the game is provided. |
| Producing and implementing | A limited attempt to create a product through coding. | The code is partly functioning and demonstrates development towards building an arcade style game. | The final product mostly functions as an arcade-style game.  | The code functions properly and presents a game that is engaging with internal and intrinsic documentation. | A game that functions with well written and efficient code, that presents a highly effective and engaging arcade-style game that utilises appropriate programming functions as well as internal and intrinsic documentation. |
| Testing | Elements of testing are present. | Elements of the product that have been tested are identified and an attempt at testing is documented. | The product has been soundly tested, demonstrating that most major errors have been identified and corrected. | Thorough testing of most aspects of the game with broad test data has been documented. | Solid evidence of testing all aspects of the product with cleanly documented results. |
| Evaluating | An attempt at peer feedback was documented. Very limited discussion of the quality of the final product. | Some peer feedback is documented. Links between the final product and the originally stated requirements are provided. | Conducted some peer feedback. The evaluation outlines how the final product generally meets the requirements as originally stated. | Conducted peer feedback with minimal evidence of applied feedback. A final evaluation that makes honest and accurate judgements on how the product meets the originally stated needs. | Conducted and applied peer feedback with the final evaluation being honest with thorough judgements on how effectively the product meets the originally stated requirements and overall quality. |

## Student support material

**Resources include**:

* Teacher resource with scaffolds, templates and graphic organisers for completing the task
* Teacher resource with additional information to support student understanding
* Program of learning.

Table – Term 1 practical application of programming timeline – Python and Pygame Zero

|  |  |  |
| --- | --- | --- |
| Week | Concepts | Function/resource |
| Week 1 | Print/input/variables (basic) | Assign variables, take input from the user and print[Variables, Input and Print](https://electronstudio.github.io/pygame-zero-book/chapters/fundamentals.html#variables) |
| Week 2 | Data types and structures Logic of code | Understand sequence, selection and iteration, and data types and structures – storing data in arrays |
| Week 3 | Functions | Understand why functions are used and their importance; how to call functions in different sections of the code |
| Week 4 | User keyboard inputLocal and global variables | Key presses and strokes |
| Week 5 | Python functions | Random |
| Week 6 | Collision Detection(*Flappy Bird*) | Determine obstacles in playing areas and create collisions |
| Week 7 | Creating *Flappy Bird* |  |
| Week 8 | Creating *Flappy Bird* |  |
| Week 9 | Creating *Snake* (or another tutorial demonstrating the same skills) |
| Week 10 | Creating *Snake* (or another tutorial demonstrating the same skills) |

Table – Term 2 project work

|  |  |
| --- | --- |
| Week | Concepts and functionality |
| Week 1 | Task 2 project work – producing and implementing |
| Week 2 | Task 2 project work – producing and implementing |
| Week 3 | Task 2 project work – producing and implementing |
| Week 4 | Task 2 project work – producing and implementing |
| Week 5 | Task 2 project work – producing and implementing |
| Week 6 | Task 2 project work – producing and implementing |
| Week 7 | Task 2 project work – testing and evaluating |
| Week 8 | Task 2 project work – testing and evaluating |
| Week 9 | Task 2 project work – testing and evaluating |
| Week 10 | Task 2 project work – testing and evaluating |

**Arcade game peer assessment rubric**

**Student name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Game title:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | Excelling | Needs improvement | Comment |
| Gameplay |  |  |  |
| Gameplay mechanics are polished and engaging, enhancing player experience. |  |  |  |
| Game mechanics are effective and functional, contributing positively to the gameplay. |  |  |  |
| Player controls are responsive and intuitive, providing a smooth gaming experience. |  |  |  |
| Functionality |  |  |  |
| All game features and functions work as intended, with minimal issues. |  |  |  |
| Visual design |  |  |  |
| Visual elements (graphics, animations and effects) are visually appealing and enhance the overall game experience. |  |  |  |
| Visual elements are present but could be improved to enhance the overall game's visual appeal. |  |  |  |
| Auditory design |  |  |  |
| Sound effects and music enhance the game's atmosphere and player engagement. |  |  |  |
| Auditory elements exist but could be improved or expanded to better engage players. |  |  |  |
| User interface (UI) |  |  |  |
| The UI is intuitive, user-friendly and enhances the player's interaction with the game. |  |  |  |
| UI elements are clear and well-organised, facilitating easy navigation and understanding. |  |  |  |
| Player experience |  |  |  |
| The game offers a highly engaging and enjoyable player experience from start to finish. |  |  |  |
| The game provides an acceptable player experience but may benefit from refinements. |  |  |  |

**Overall comments**:

## Additional information

This resource has been developed to assist teachers in NSW Department of Education schools to create learning that is contextualised to their classroom. It can be used as a basis for the teacher’s own program, assessment, or scope and sequence, or be used as an example of how the new curriculum could be implemented. The resource should be used with timeframes that are created by the teacher to meet the overall schedules of assessment.

For additional support or advice, contact the TAS curriculum team by emailing TAS@det.nsw.edu.au.

### Assessment advice

Assessment is a powerful tool to measure student learning and plan for the next stages in the learning process. Some considerations in using parts of this assessment notification are:

* Consider the skills, knowledge, and understanding students need to complete the task, and see where there are opportunities for them to refine these through ongoing feedback in the learning sequences associated with the assessment task.
* Ensure the language and readability of the task presents an appropriate challenge for the students the task is being used with. Direct, plain English will allow the greatest number of students to access the task independently.
* Marking guidelines should directly reflect the success criteria and outcomes of the task and align with appropriate levels of achievement for the relevant stage.
* When constructing or adjusting the marking guidelines and/or rubric, try to keep active verbs like ‘do’, ‘say’, ‘make’, or ‘write’ in mind to measure student performance at each level. This will help to avoid subjective language.

### Assessment as a learning opportunity

Assessment can provide ways for students to use formal and informal feedback and self-assessment to help them understand where they are in their learning, where they are going, and how they are going to get there. It is essential that students receive feedback on their performance in the task and have opportunity to clarify and plan the next steps in learning.

* Clear and explicit marking rubrics can support effective self-assessment in relation to the learning intentions and success criteria assisting students to become owners of their own learning. Students can then build their capacity for individual goal setting, which includes students asking questions such as, ‘What do I need to improve?’ and ‘What is my next step?’ ([CESE Growth goals setting – what works best in practice](https://education.nsw.gov.au/about-us/educational-data/cese/publications/practical-guides-for-educators/growth-goal-setting)).
* Greater learning gains may be made when teachers provide explicit descriptive feedback to students in a timely manner. This feedback supports students in forming their learning goals as well as helping the teacher to plan for the next iteration of the teaching and learning cycle.

#### Differentiation advice

Differentiated learning can be enabled by differentiating the assessment approach to content, process, and product. Reasonable adjustments of assessment for students with disability is a legal requirement under the [*Disability Standards for Education 2005* (Cth)](https://www.dese.gov.au/disability-standards-education-2005). For students with a disability, adjustment in assessment tasks should be made through the [Collaborative curriculum planning](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/diversity-in-learning/special-education/collaborative-curriculum-planning) process. For more information on differentiation, go to [Differentiating learning](https://education.nsw.gov.au/teaching-and-learning/professional-learning/teacher-quality-and-accreditation/strong-start-great-teachers/refining-practice/differentiating-learning) and [Differentiation](https://education.nsw.gov.au/campaigns/inclusive-practice-hub/primary-school/teaching-strategies/differentiation). When using this resource, teachers can use a range of [adjustments](https://education.nsw.gov.au/teaching-and-learning/disability-learning-and-support/personalised-support-for-learning/adjustments-to-teaching-and-learning) to ensure a personalised approach to student learning.

* Some common adjustments are available through the [Inclusive Practice hub assessment and reporting](https://education.nsw.gov.au/campaigns/inclusive-practice-hub/all-resources/secondary-resources/other-pdf-resources/nesa-assessment-and-reporting) site.
* The [HPGE Differentiation Adjustment Tool](https://education.nsw.gov.au/teaching-and-learning/high-potential-and-gifted-education/supporting-educators/implement/differentiation-adjustment-strategies) and [Differentiation Package](https://schoolsnsw.sharepoint.com/sites/HPGEHub/SitePages/Home.aspx#first-time-access-to-hpge-resources) can assist teachers to decide how to provide extension and additional challenge for High Potential and Gifted (HPG) students.

The steps below may be useful to consider when creating access opportunities for all students:

* remove unnecessary words or images
* simplify any tricky words or make a glossary of subject-specific words
* reduce the lexical density of the steps and use student-friendly language
* chunk large passages of reading or offer alternate ways of representing the information, such as a visual
* make the task description a checklist with numbered steps
* limit options and/or reduce the number of choices students need to make independently.

### Support and alignment

**Resource evaluation and support**: all curriculum resources are prepared through a rigorous process. Resources are periodically reviewed as part of our ongoing evaluation plan to ensure currency, relevance, and effectiveness. For additional support or advice contact the TAS curriculum team by emailing TAS@det.nsw.edu.au.

**Alignment to system priorities and/or needs**: [School Excellence Policy](https://education.nsw.gov.au/policy-library/policies/pd-2016-0468), [School Success Model.](https://education.nsw.gov.au/public-schools/school-success-model/school-success-model-explained)

**Alignment to the School Excellence Framework**: this resource supports the [School Excellence Framework](https://education.nsw.gov.au/policy-library/policies/pd-2016-0468) element of assessment (formative assessment, summative assessment, student engagement).

**Alignment to Australian Professional Teaching Standards**: this resource supports teachers to address [Australian Professional Teaching Standards](https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/meeting-requirements/the-standards/proficient-teacher) 5.1.2, 5.4.2.

**Consulted with**: Curriculum and Reform and subject matter experts

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**Related resources**: further resources to support Computing Technology Stage 5 can be found on the [TAS curriculum page](https://education.nsw.gov.au/teaching-and-learning/curriculum/tas).

**Professional learning**: relevant professional learning is available through the TAS statewide staffroom.

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## Evidence base

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