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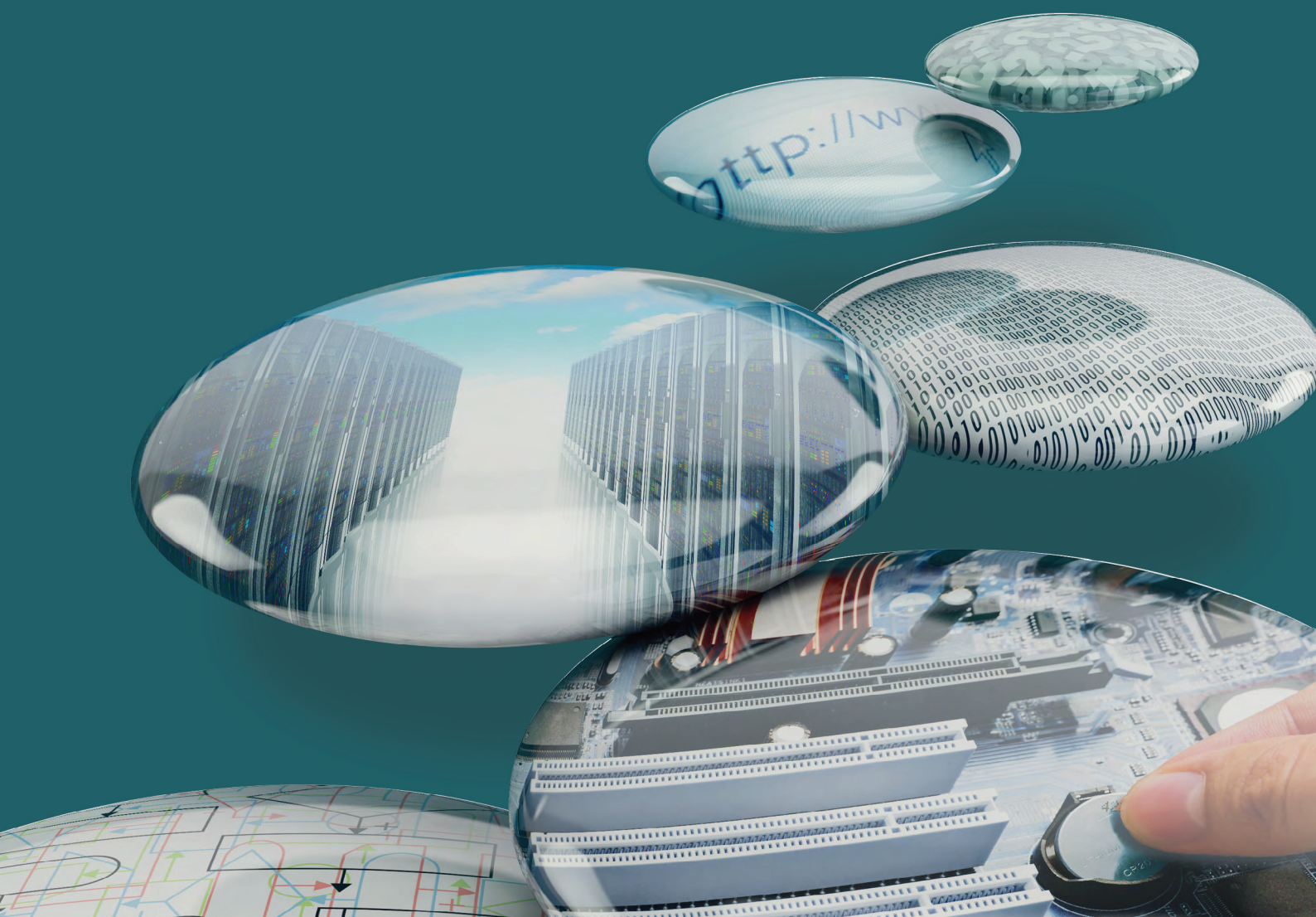
Topic Exploration Pack

H046/H446

COMPUTER SCIENCE

Theme: Software Development

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This Topic Exploration Pack should accompany the OCR resource 'Software Development' learner activities, which you can download from the OCR website.



*This activity offers an
opportunity for English
skills development.*



Software Development

Regardless of the formal development model chosen, software development comes down to satisfying the maximum number of objectives, keeping in mind that some objectives (e.g. deadlines) might be in conflict with others (e.g. extra features). All models try to avoid known mistakes in software development – cost and time overruns, undiscovered bugs, spending disproportionate amount of time on minor features, getting too ambitious via ‘feature creep’ and, worst of all, the product that doesn’t satisfy the customer. All these issues commonly afflict pupil’s coursework, often for the same reasons as in the industry. The presentation of this topic could be supported by demonstrating past coursework projects that was not done well with explanations, using the terminology of this topic. Development involves a lot of people, especially on the developing and testing side, but also on the client’s side, working concurrently to a common plan. The chosen development model determines the scheduling of their communication and the process of implementing client’s initial needs and feedback on the stages of the project completed.

Learners should understand that the waterfall lifecycle model is best for routine mass-produced products (analogous to making of bicycles, for example in the traditional manufacturing sector); agile methodologies focus on the skills and talents of programmers allowing them to interact with all stakeholders without long-term planning, with incremental changes and very short timeframes; spiral system of development is somewhat similar to agile in its emphasis on incremental changes and constant feedback from users but would be applied in much larger scale projects and be more formal.

None of the models guarantees success. A salesperson working for the development company might have mis-sold the product to client, and the client might not know themselves what they need and will try to blame the developer – following the mutually agreed model gives a certain assurance that the blame will be more fairly apportioned.

Rapid prototyping tries to build on the strengths of the team and perhaps, even happy accidents encountered along the way, rather than on objectives and rigid planning. The very concept of prototyping implies creating something. Experimentation and multiple early prototypes affect the objectives in an opportunistic way. A lot of scientific discoveries and engineering breakthroughs happened without the formal process and rapid prototyping is trying to recreate such successes. Agile and spiral models are used in rapid prototyping and it is more prominent in the development of graphical user interfaces where feel is important and feel can’t really be planned (think the design of Apple mobile products).



The increased switch from the waterfall to other models is driven by a current trend in start-ups and apps which are created in the hope of them ‘catching on’ – there is no customer to approach the company for the contract. Another driving force is the ever rapidly changing technological landscape where long-term planning is always behind the times.

A teacher should keep in mind that these models were meant for large organisations and projects of high complexity. It is unrealistic to expect pupils to use this for all of their programming work – it just wouldn’t be necessary. However, the coursework element of the course assigns marks by waterfall/spiral-inspired categories, so perhaps a light version of any of the models can be used to mark pupils’ routinely submitted work to get them used to the marking scheme.

It is helpful to have some knowledge of the Silicon Valley start-up culture and the history of some successful start-ups, e.g. Google, Uber, Facebook. Wired.com (or its paper version – the Wired Magazine) is the most influential (and well-written) magazine on the modern computing professionals. Watching the movie *Social Network* might be an easy introduction to the ethos of the Silicone Valley and its emphasis on ‘creative destruction’.

Additional reading on development models from an industry

professional: <http://www.aafriin.com/2012/06/22/the-difference-in-waterfall-model-and-spiral-model-on-information-system-development/>

Useful link for an unusual use of a rapid prototyping tool

(Lucidchart): <https://www.youtube.com/watch?v=pLF8LqbWoCs>

Student Sheets

Activity 1: rapid prototyping and user feedback

Activity 2: development model

Activity 3: development and prototyping

Activity 4: writing and following algorithms





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